ELECTRICAL TIMES

THURSDAY
4 JAN.
1951
SIXPENCE

A New

Type L

CLIP-ON AMMETER

Specially designed for use with porcelain clad fuses and heavy duty conductors up to 4" diameter.

Fully insulated core

7 RANGES

0 — 10
0 — 25
0 — 50
0 — 100
0 — 250
0 — 500
0 — 1000

Amperes A.C.

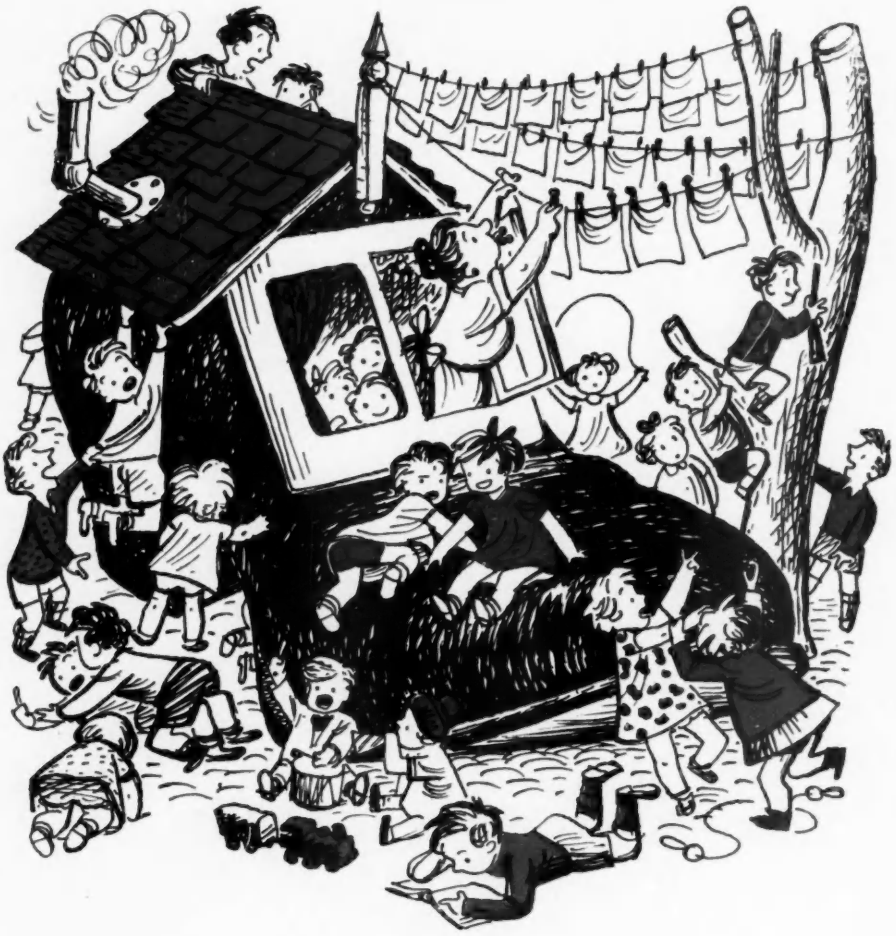
F

FERRANTI

FERRANTI

F180a

FERRANTI LTD. HOLLINWOOD LANCS.
LONDON OFFICE: KERN HOUSE, KINGSWAY, W.C.2.



—but there are more than 2000

standard motors in the Parkinson range

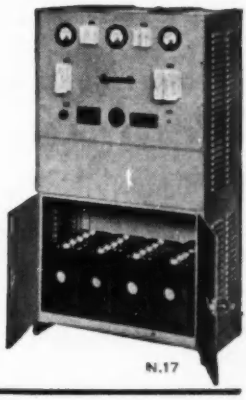
Crompton Parkinson LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

Telephone Chancery 3333 *Telegrams Crompark, Estrand, London*

AS CERTAIN AS THE COMING OF SPRING

If the mains should fail, the **Nife-Neverfayle emergency lighting equipment** will instantly, automatically flash into action with complete reliability. That is the special advantage of the NIFE battery. For a NIFE battery will not deteriorate even during months of inactivity—its electrolyte is almost inert. A NIFE battery can stand up to rough handling and neglect—it is made principally of steel. And finally, a NIFE battery's first cost is almost its last cost—it needs practically no attention. Hospitals and cinemas all over the world have already installed Nife-Neverfayle emergency lighting equipment.



NIFE-NEVERFAYLE

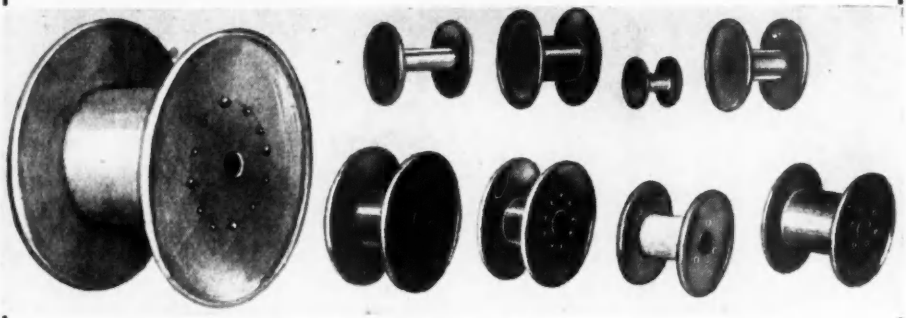
THE EMERGENCY LIGHTING EQUIPMENT

with the STEEL battery

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

REELS LTD.

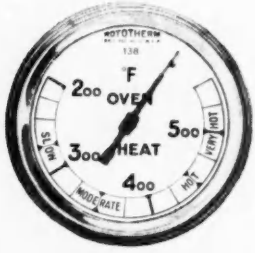
BYRON STREET : PRESTON : 'PHONE : 3922



Makers of all kinds of wood and steel reels for the electric wire and cable trades.

Our Speciality :—Steel flanges with very strong beaded edges in a wide range of diameters.

Try **REELS LTD.** *for* **R**igid **E**fficient **E**ver-lasting **L**ight **S**trong



DIAL THERMOMETERS

ACCURATE TEMPERATURE AT A GLANCE

The clear dial, robust construction and high degree of accuracy make this specially designed Oven model the best of its type available. Write for Catalogue "Modern Thermometry" which gives details of models for indicating, controlling and recording temperature.

Rototherm

THE BRITISH ROTOTHERM CO. LTD.

Herton Abbey, London, S.W.19 Phone: LIBerty 3406

THE STEEL COVERED HEATER WITH

1001

USES

IN its variety of forms, the Cressall steel jacketed unit heater is the solution to most heating problems. Let a Cressall Technical Expert discuss heating with you before you decide. He will be happy to help.

CRESSALL

Registered Trade Name of

THE CRESSALL MANUFACTURING CO., LTD.

Tower Street, Birmingham 19

Telephone : ASTon Cross 2666 (3 lines).

Telegrams : "OHMIC, Birmingham"

Burco

ELECTRIC WASHBOILER

Cat. No.
E840

DESIGNED FOR LONG TROUBLE-FREE SERVICE

MANUFACTURED BY AN ORGANISATION WHICH CONCENTRATES ON WASHING APPLIANCES

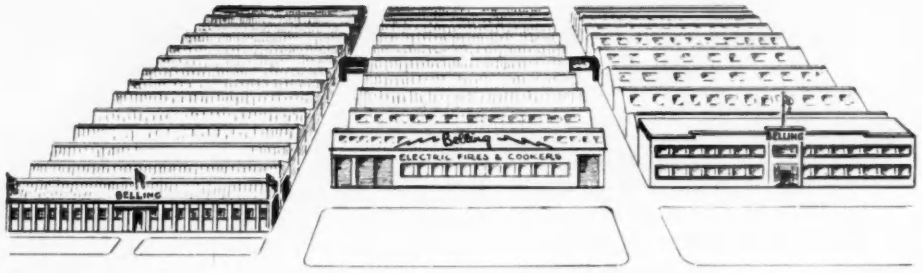
DETAILS PERFECTED TO A HIGH DEGREE

DESIGNED BY SPECIALISTS WHO ARE EXPERTS BY EXPERIENCE

All enquiries to

BURCO LTD

ROSE GROVE · BURNLEY · LANCS



1912 *The Story of* BELLING *& Company Ltd.* No. 20 1950

WELL, here we are at the beginning of 1951, and I think everyone hopes that this will be a peaceful and a prosperous year.

As far as our own immediate programme is concerned we are setting out full of energy and enthusiasm to increase our production and our efficiency. We have planned another new building for our offices, and this will release the present space occupied by them for the storage of raw materials, and so on. We also have to tackle a big extension to our foundry and these two extensions, totalling some 47,000 sq. ft., will use up the remainder of our available land and will be in addition to the 240,000 sq. ft. we already have under cover.

We often used to advertise that we had the biggest plant in the world devoted exclusively to the production of Electric Fires and Cookers, and it is quite possible that we are still in this same position today. Anyway with our recent new extensions we shall be able to greatly increase our output. This, as a matter of fact, is rising rapidly even now, and when our financial year closes at the end of March we shall no doubt have achieved another record. The year ending March 31, 1950, was in itself a record in every way. Our export figures were splendid and our total sales for the year were an "all time high." Our profits, too, were reasonably good in proportion, and I was very pleased to be able to share out some of these—in fact, over £20,000 amongst our employees. This distribution was made largely on a length of service basis.

As an example of building up a business entirely out of its own profits, these Works even as they stand at the moment form a very striking illustration. As you may remember from one of the previous early chapters, we started in a workshop with about 900 sq. ft. of space and with only three people. Now we have about 240,000 sq. ft. of space and employ on the average about 1,000 people. The financial side of this business is equally as interesting as the productive side, and is a practical example of what can be done by private enterprise and by ploughing back the bulk of the profits.

In Chapter 3 I mentioned that we started off with £450 of new money, and from this the business has built itself up, year by year, out of its own profits to its present size, its assets being now worth well over a million pounds. The land and buildings alone, for instance, at today's price would represent fully £500,000. Then there is also the plant, machinery, raw materials, work in progress, stocks, etc., in addition. Goodwill and patents also have a place.

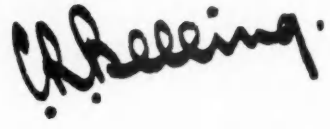
This has taken about 38 years to do, but nevertheless it is quite a good life's work.

Obviously, it has only been with the complete co-operation of the staff and employees generally that this result has been achieved, and I am only too happy once again to record my acknowledgment and great appreciation of their efforts.

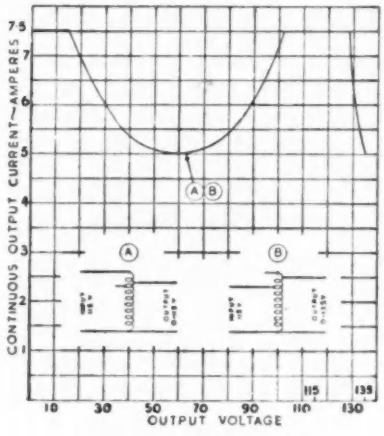
The five Senior members of my Staff are, of course, entitled to special credit, and on account of our recent record years I think this is a very suitable occasion on which to make them Directors in addition to their present duties.

With regard to our employees generally, they all have the opportunity of working up to more important positions as charge-hands, foremen, supervisors, managers, etc., and I must record that during our whole history we have never had a single serious strike. We have seven trade unions represented here with their Shop Stewards, and we all work very happily together through our works committees.

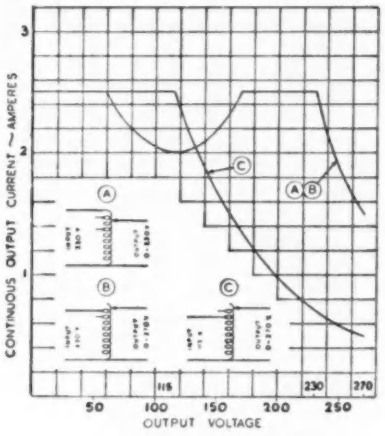
The next chapter, No. 21, will deal with a few other items which have arisen during the run of this series.



VARIAC voltage-regulating infinitely variable transformer



TYPES 200-C.U./C.M.



TYPES 200-C.U.H. C.M.H.

SERIES "200" VARIAC TRANSFORMERS

With a VARIAC, voltages are instantly and minutely adjustable from O-Line Voltage. On some patterns, such as 200-C.U.H. there is even an "over voltage" feature. This can provide over line voltage, or compensate for low lines. Many other suggestions on the use of Variac Transformers are contained in Catalogue V549 which will gladly be sent on request.

- **1. Infinitely variable voltages.**
- **2. Smooth, precise adjustment.**
- **3. Dial calibrated in output voltage.**
- **4. Large current-handling ability.**
- **5. Excellent voltage regulation.**
- **6. Low temperature rise.**
- **7. Catalogue V549 (32 pages) gives full details of all available patterns, from 580 va to 7,000 va.**

TYPE 200-C.U.H.

CLAUDE LYONS LTD.

ELECTRICAL AND RADIO LABORATORY APPARATUS, ETC.

180 Tottenham Court Road, London, W.1, and 76 Oldhall Street, Liverpool, 3, Lancs.

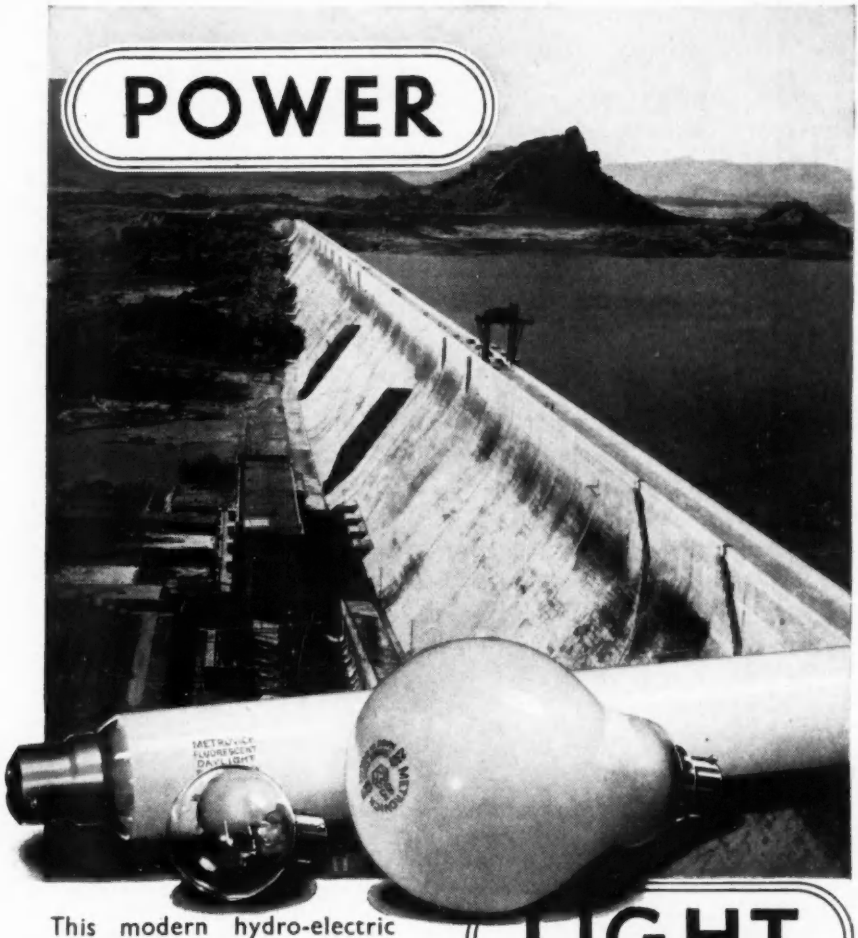
Copper was well in the industrial picture in 1851. Tons of Copper were used in the G.W.R. express locomotive shown at the Great Exhibition.

COPPER IN THE PICTURE

Copper has always been in the forefront of the industrial picture. And now, with the growth of its large family of alloys, copper can help industry more than it has ever done. The Copper Development Association, a non-trading organisation, backed by the full resources of the British copper industry, exists solely to help copper to help you. A sound opinion on everything that copper can or cannot do is obtainable without charge or obligation simply by asking the C.D.A.

THE COPPER DEVELOPMENT ASSOCIATION

KENDALS HALL · RADLETT HERTS · RADLETT 5616



This modern hydro-electric station at Mettur Dam — part of the extensive power and irrigation scheme of the Madras Government — contains 4 Metrovick 12,500 kVA generators. Millions of people depend upon Metrovick equipment for their electricity.
You are assured of that same reliability of service when you buy

METROVICK LAMPS

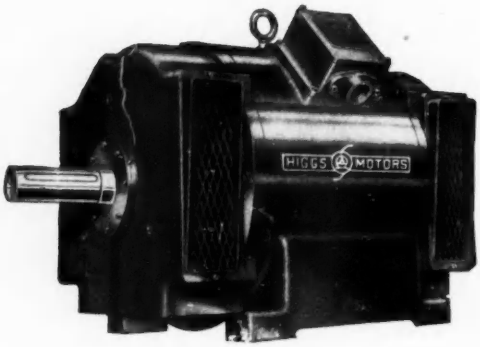
METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

ST. PAUL'S CORNER, 1-3, ST. PAUL'S CHURCHYARD, LONDON E.C.4.

Member of the A.E.I. group of companies

S/A 011

TRADE + MARK −
HIGGS MOTORS
CHAIRMAN WALTER F. HIGGS, M.I.E.E. LTD.
BIRMINGHAM 6 ENGLAND

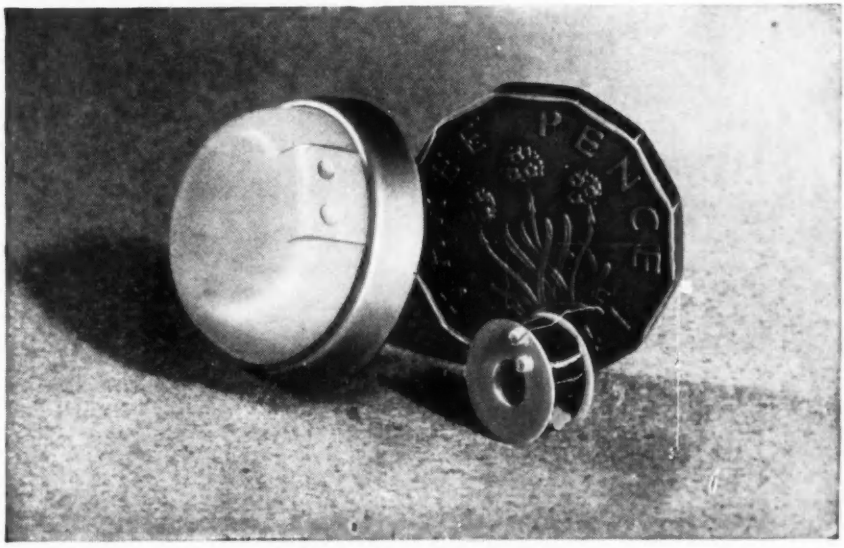


From $\frac{1}{8}$ to 700 H.P.

Assist the sales of YOUR products —
by standardising on HIGGS MOTORS

GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton



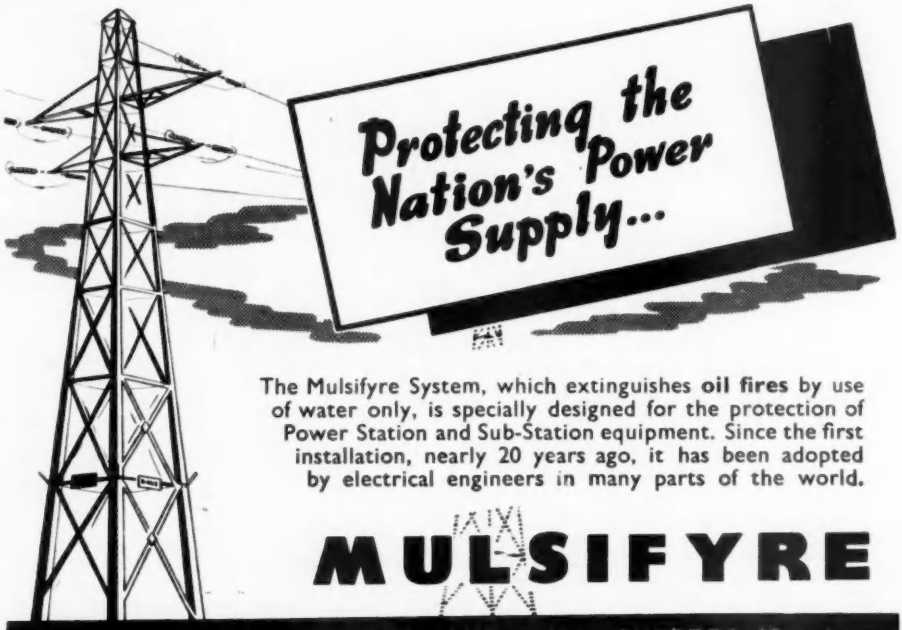
WORLD'S SMALLEST 5000-TURN COIL

There are 250 feet of BICC 49 SWG Enamelled Winding Wire in this coil — the smallest 5000-turn coil in the World. Its total weight — including Polystyrene bobbin — is only ·76 grammes!

These coils are used by Messrs. Amplivox Ltd., making their Deaf Aid earphones even less conspicuous than ever. BICC manufacture a wide range of winding wires and strips for every need — from tiny Deaf Aids to heavy-duty alternators and motors. Let us send you further information in Publication No. 266V.

B.I. Callender's *Winding Wires*

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2



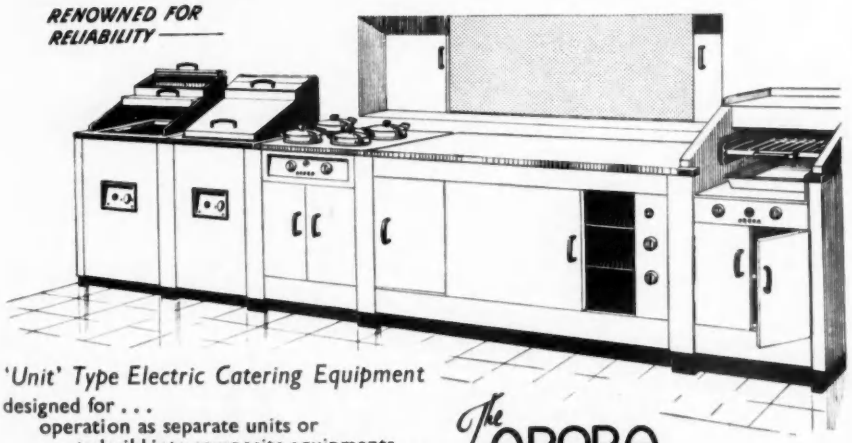
The Mulsifyre System, which extinguishes **oil fires** by use of water only, is specially designed for the protection of Power Station and Sub-Station equipment. Since the first installation, nearly 20 years ago, it has been adopted by electrical engineers in many parts of the world.

MULSIFYRE

MATHER & PLATT LTD · MANCHESTER 10

'ARORA'

RENOWNED FOR RELIABILITY

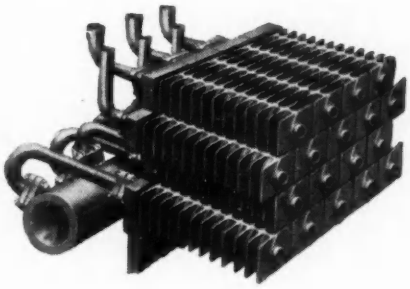


'Unit' Type Electric Catering Equipment
designed for . . .
operation as separate units or
to build into composite equipments . . .

Special Display on STAND 88 (New Hall)
The Hotel & Catering Exhibition
City Hall, Deansgate, Manchester
January 31st to February 10th

The ARORA Company
ROSEBERY STREET · LOUGHBOROUGH
TELEPHONE 2603
231

• COMPACT DESIGN
• RESISTS CORROSION
• READY INSPECTION
• LOWEST MAINTENANCE

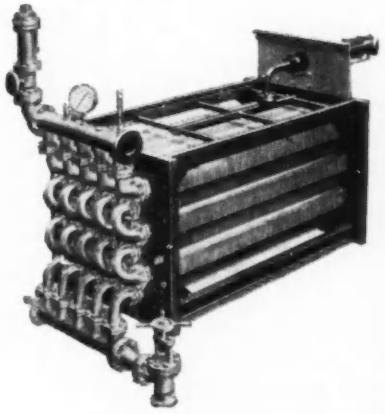


• TYPE 12

The steel tube construction of the Type 12 Economiser makes it suitable for pressures up to the highest encountered. Cast iron gilled sleeves shrunk on to the steel tubes provide high heat-transfer; note the good accessibility for inspection. Joints may be bolted or welded as preferred.

• TYPE 25

This type of economiser has the extended heating surface in a most compact form, as the tubes are of cast iron gilled formation. Suitable for pressures up to 650 lb. per square inch.



GREEN'S ECONOMISER

E. GREEN & SON LTD · WAKEFIELD

Makers of economisers for more than one hundred years

GE70a

C.M.A.-CABLES

In the air, on sea or on land, all scientific triumphs call for the finest and most reliable equipment.
Therefore when cables are required, always specify

C.M.A.

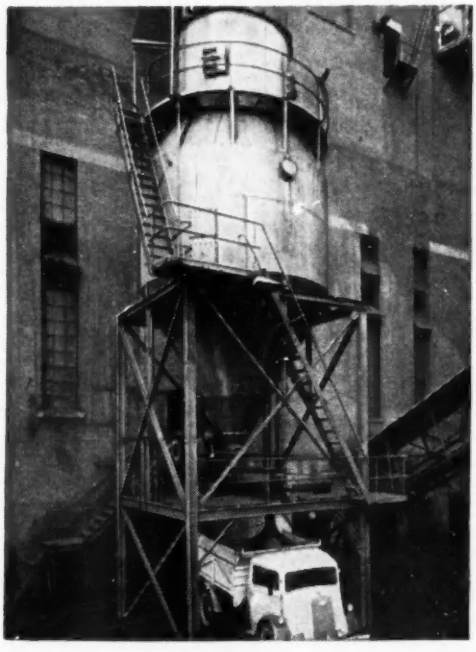
MEMBERS OF THE C.M.A. & AFFILIATED MANUFACTURERS' ASSOCIATIONS

British Insulated Callender's Cables Ltd.
Connollys (Blackley) Limited.
The Craigpark Electric Cable Company Limited.
Crompton Parkinson Limited.
Enfield Cables Limited.
The Edison Swan Electric Company Ltd.
Greengate & Irwell Rubber Company Limited.
W. T. Glover & Company Limited.
W. T. Henley's Telegraph Works Company Limited.
Johnson & Phillips Limited.
Liverpool Electric Cable Company Ltd.
Metropolitan Electric Cable & Construction Co. Ltd.
Pirelli-General Cable Works Limited (The General Electric Co. Ltd.).
Siemens Brothers & Company Limited (Siemens Electric Lamp & Supplies Limited).
St. Helens Cable & Rubber Company Ltd.
Standard Telephones & Cables Limited.
The Telegraph Construction and Maintenance Co. Ltd.

MAINS CABLE MANUFACTURERS ASSOCIATION
MAINS CABLE MANUFACTURERS ASSOCIATION (SUPER-TENSION)
RUBBER & THERMOPLASTIC CABLE MANUFACTURERS ASSOCIATION
Affiliated to
CABLE MAKERS ASSOCIATION
52-54 High Holborn, London, W.C.1. Tel: Holborn 7633

FLUE DUST AND RIDDLINGS

EXTRACTION PLANT



● The Nation's need demands that Coal shall convert every possible fraction of its energy into power for production. The vital contribution that efficient combustion makes to this end is immeasurably facilitated by B.V.C. Flue Dust Removal Plant. This is the recognised method of keeping steam boilers free from accumulations of flue dust, and ensuring that every ton of coal is used to the best possible advantage by removing and consuming the riddlings.

For Information and Consultation write to Dept. 14

B.V.C. INDUSTRIAL CONSTRUCTIONS LTD

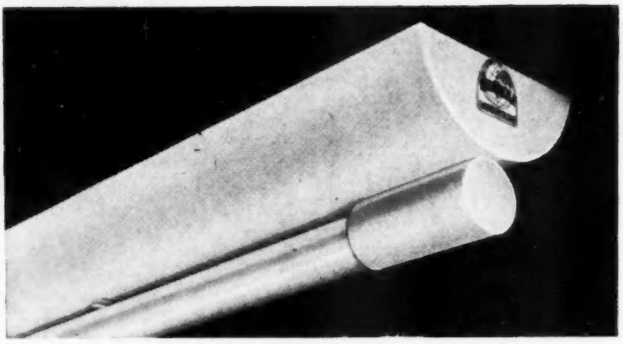
(Subsidiary of the British Vacuum Cleaner and Engineering Co., Ltd.)

Terminal House, 52, Grosvenor Gardens, London, S.W.1. Sloane 9975/8. Head Office : Leatherhead, Surrey.

NEW ERA *Distinctive* LIGHTING FITTINGS

AND HIGH-GRADE
APPROVED and GUARANTEED
CONTROL GEAR

Latest addition to the Industrial and Commercial range



TYPE 18R
LIST PRICE (less lamp) £4.19.6

A new 5ft. Batten fitting of artistic merit for 1—80 watt lamp. Control Gear contains tapped choke, P.F. condenser and specially tested glow starter switch.

TYPE 28R
LIST PRICE (less lamp) £8.15.0

As above except constructed to take 2—80 watt lamps. Control Gear is specially designed with a balanced lead-lag circuit. Voltage must be stated.

- Rust-proofed before enamelling
- Each fitting stove-enamelled twice
- Tested and approved by Electricity Board Test House

STOCKED BY LEADING WHOLESALERS

Apply for comprehensive illustrated catalogue to the manufacturers :

NEW ERA INDUSTRIES (Tottenham) LTD., **Stoneleigh Rd., Tottenham London, N.17.** Tel. Tottenham 5309, 6536

STEATITE INSULATING BEADS

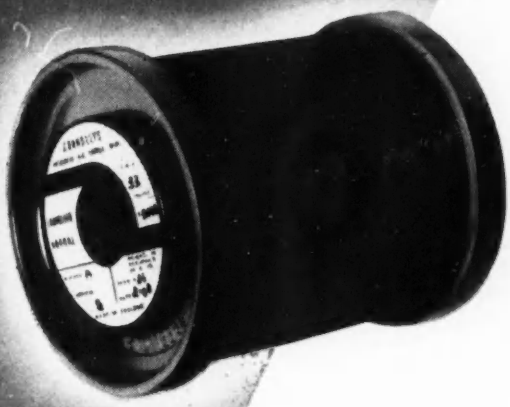
S.P. Insulating Beads are extremely strong and fully vitrified, yet very low in price. They are now available from stock. Sizes for wire 4-18 S.W.G.

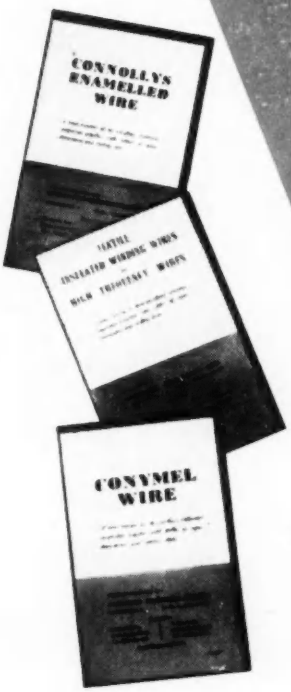
STEATITE & PORCELAIN PRODUCTS LTD.

Stourport-on-Severn. Tel: Stourport 111. Grams: Steatain, Stourport

S.P.(1)

CONNOLLYS





FOR ALL TYPES OF WINDING WIRES

Backed by 50 years manufacturing experience Connollys' range of winding wires are unsurpassed for quality.

Whether the insulation consists of Enamel, Cotton, Silk or Rayon, strict technical control over every stage of manufacture — plus a priceless fund of experience—ensures uniformity of quality of the highest degree.

Send for free leaflets describing these products.

CONNOLLYS (BLACKLEY) LTD

Manchester 9. CHEetham Hill 1801

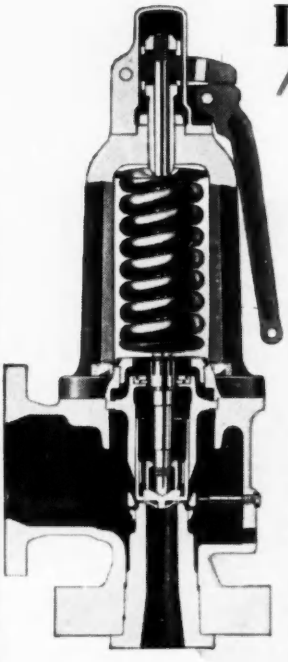
London Office:
34, Norfolk Street,
London,
W.C.2.
TEMple Bar 5506.

Birmingham Office:
19, Bent Avenue,
Quinton,
Birmingham 32.
WOOdgate 2212.

5247B

A CONSTANT OF 44

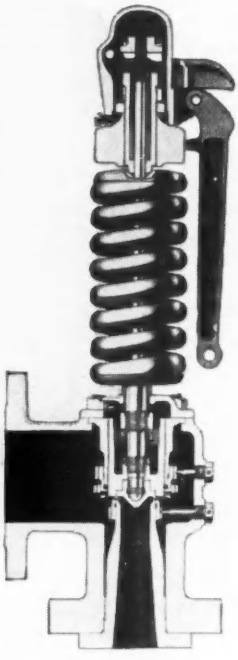
DEWRANCE-CONSOLIDATED
FULL-LIFT SAFETY VALVES



Dewrance-Consolidated Full Lift Safety Valve

The high capacity and low blow-down of Dewrance-Consolidated Full Lift Safety Valves has recently been demonstrated by very successful high pressure, high temperature capacity tests carried out in co-operation with the B.E.A. and associated authorities.

The test proved that these valves have a greater discharge capacity than the normal Full Lift Safety Valve and therefore fewer valves or smaller sizes are required per boiler. A Constant of 44 can be used in conjunction with the formula given in B.S.S. 759 in calculating capacities. The Free Discharge Area through the Valves can be obtained from us on request.



Dewrance-Consolidated Maxiflow Safety Valve

Solely manufactured and supplied by

DEWRANCE & Co LTD

GREAT DOVER STREET, LONDON S.E.1.

Works: LONDON, DUMBARTON & HILLINGTON Phone: HOP 1244 (10 Lines)

EDISWAN BATTERIES
installed in the new
HOUSE OF COMMONS

An installation of 190 Ediswan CD2S enclosed cells is at work operating the Annunciator Equipment of the new House of Commons. Each cell has a capacity of 30 ampere hours at the 10 hour rate of discharge. The installation is maintained on trickle charge by Ediswan Tungar Selenium type Battery Charging Equipment of slightly modified design.

Supplied fully charged and with double-tier double-row stands painted to the Architects' choice of venetian red, the batteries were erected by The Exchange Telegraph Company who supplied and installed the Annunciator system.

EDISWAN
STATIONARY BATTERIES

THE EDISON SWAN ELECTRIC CO. LTD.
Member of the A.E.I. Group of Companies
Head Office: 155 Charing Cross Road,
London, W.C.2. Works: Ponders End, Middx.

EDISWAN CABLES WERE USED FOR THE INSTALLATION

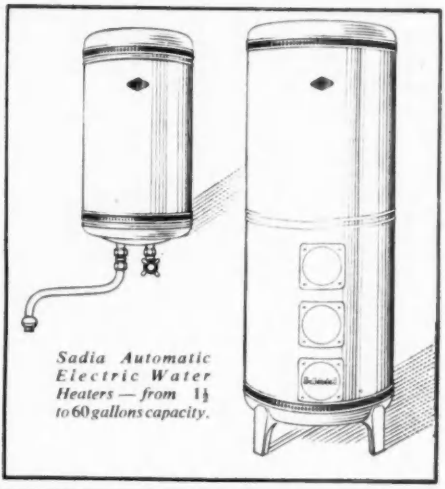
B584

SADIA ELECTRIC WATER HEATERS

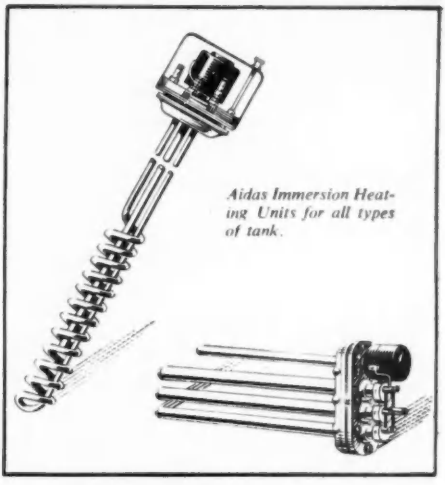
AND AIDAS IMMERSION HEATING UNITS

fit every purpose and satisfy every need in industry and the home

AIDAS Electric Ltd., specialists in hot water by electricity, have spent more than 25 years in the production of electric water heating appliances of the highest quality. From their wide range you can find an appliance to answer nearly all water-heating problems. Sadia Automatic Electric Water Heaters—free outlet, pressure and cistern types—are made from 1½ to 60 gallons capacity. Aidas Immersion Heating units are available to fit all kinds of tanks and cylinders. When you specify a Sadia electric water heater or an Aidas Immersion Heating Unit you know that you are ensuring long years of trouble-free, efficient hot water supply.



Sadia Automatic Electric Water Heaters — from 1½ to 60 gallons capacity.



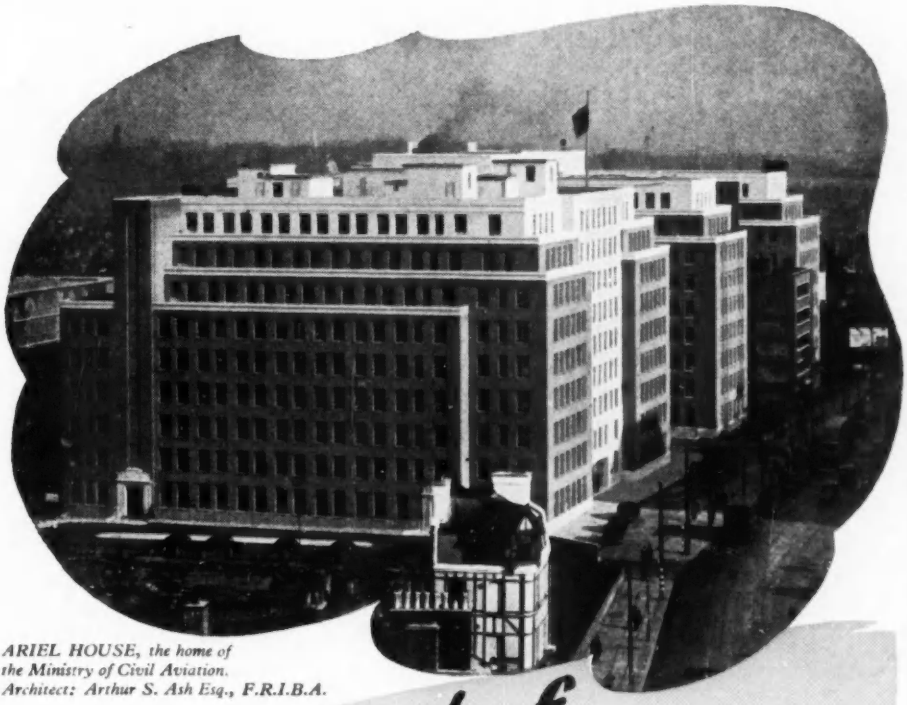
Aidas Immersion Heating Units for all types of tank.

SEND FOR THE NEW AIDAS LEAFLET — FREE!

THIS NEW LEAFLET gives full details of all the Aidas Immersion Heating Units—side-entry, top-entry, and external connection. Keep this complete information always handy in your file. If you have not yet had your copy of the Sadia Electric Water Heater leaflet, ask for one also.

SADIA
HOT WATER BY ELECTRICITY

AIDAS ELECTRIC LTD., SADIA WORKS, ROWDELL ROAD, NORTHOLT, MIDDLESEX. SCOTTISH AGENTS: W. BROWN AND CO. (ENGINEERS) LTD., 89 DOUGLAS STREET, GLASGOW, C.2., MANUFACTURED IN SOUTH AFRICA BY SADIA WATER HEATERS (PTY.) LTD., 3-5 NEWTON STREET, JOHANNESBURG



ARIEL HOUSE, the home of the Ministry of Civil Aviation. Architect: Arthur S. Ash Esq., F.R.I.B.A.

130,250 yards of ENFIELD V.I.R. CABLES installed by

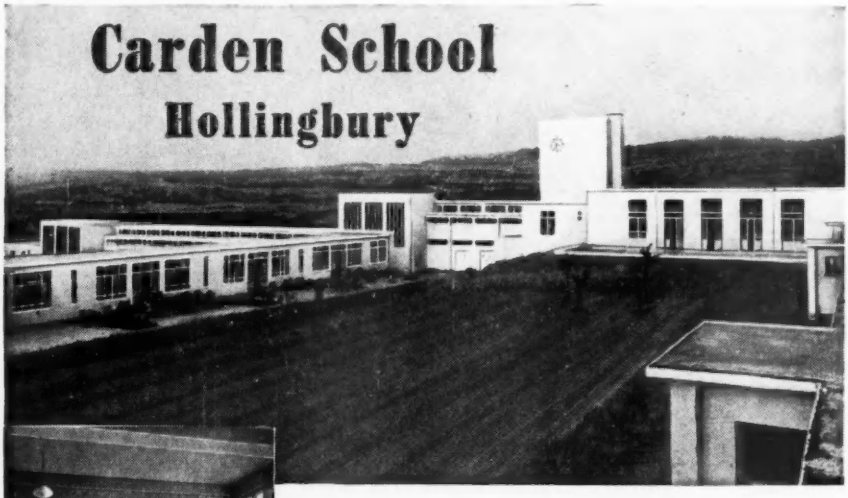
T. CLARKE & CO., LTD.
129 Sloane Street, London, S.W.1

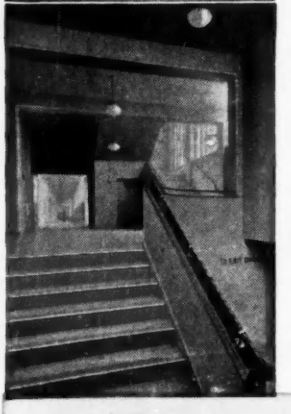
ARIEL HOUSE, in Theobalds Road, London, W.C.1, is within sight of our London Branch in Southampton Row. The very large quantity of Cable used by T. Clarke & Company Limited was supplied from stock.

ENFIELD CABLES LIMITED
BRIMSDOWN, MIDDLESEX
HOWard 2661 (Works) London Office: HOLborn 0591

BELFAST, BIRMINGHAM, BRIGHTON, BRISTOL, CARDIFF, GLASGOW, HULL, IPSWICH, LEEDS, MANCHESTER, NEWCASTLE, NOTTINGHAM, PLYMOUTH, SELBY, SOUTHAMPTON, STOKE AND THROUGHOUT THE WORLD.

Carden School
Hollingbury





This new primary school for 840 children near Brighton occupies a site of over 13 acres.

It was designed by D. J. Howe, M.I.C.E., M.I.Mun.E., Borough Engineer and Surveyor, in collaboration with P. Billington, A.R.I.B.A., A.M.T.P.I., School Architect for the Borough of Brighton Education Committee.

It is the first school of its kind to be constructed of precast concrete. Over ten miles of BICC Rubber Insulated Cables were used by **Messrs. Hall & Stinson Ltd., of Brunswick Place, Hove, and Sheffield**, who overcame the special wiring problems involved in this unusual form of construction.

B.I. Callender's

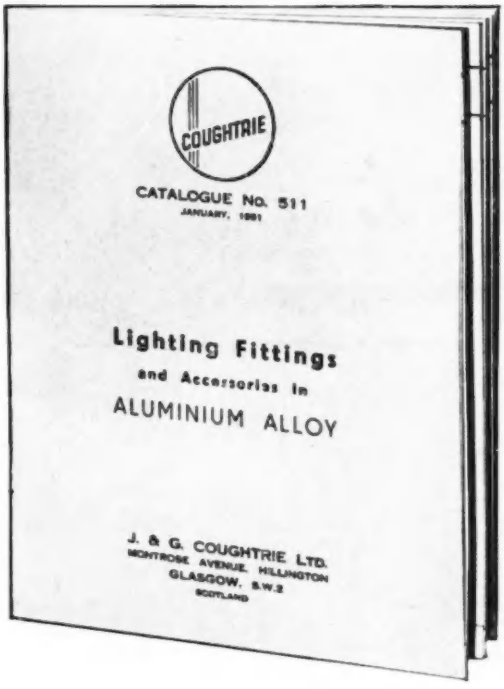
Rubber Insulated Cables

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

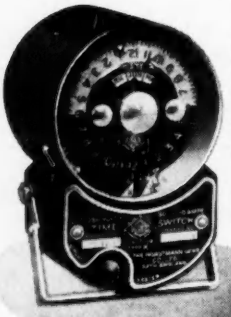
COUGHTRIE

Now Available!

OUR 1951 ILLUSTRATED CATALOGUE



IF YOU WOULD LIKE A COPY OF THIS NEW PUBLICATION MAILED TO YOU, JUST SAY THE WORD



H.B.E. Time Switches are renowned for their unfailing reliability. Our comprehensive range of switches covers hand wound models (15, 21 and 40 day run) Synchronous and electrically - wound models with reserve spring run.

May we quote you for your requirements?

Unfailing Reliability

H B E

Electric

TIME SWITCHES

FOR PUBLIC LIGHTING INDUSTRIAL AND DOMESTIC USE

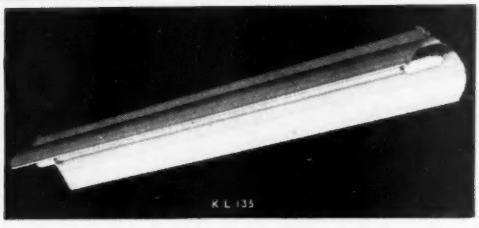
THE HORSTMANN GEAR CO. LTD

NEWBRIDGE WORKS · BATH · ENGLAND · TEL: BATH 7241 · GRAMS HORSTMANN BATH

A range

WITHOUT EQUAL

EST · 1895 SMITH LTD

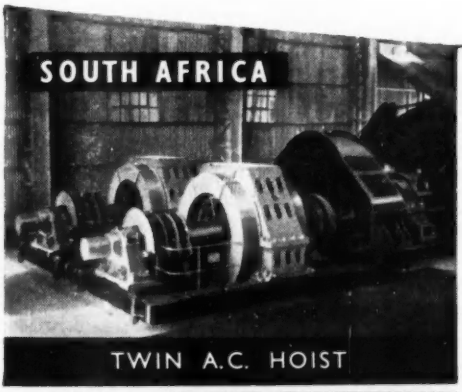


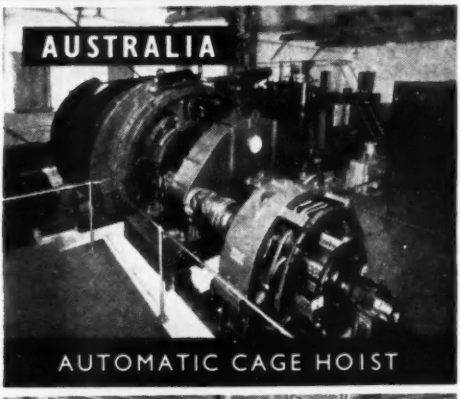
K.L.135. This new Smithlite Dispersive Reflector Fitting has a detachable prismatic type reflector with eleven reflecting angles. The Control Gear, which is totally enclosed, comprises of High Power Factor Ballast, Starter Switch, and Suppressor Capacitor Assembly (Canister Type) wired and ready for immediate connection. The entire fitting is Stove Enamelled and Rust Proofed. Designed for either chain or conduit suspension.

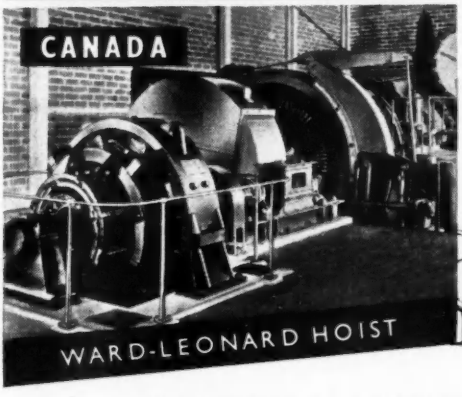
The K.L.135 is a 5 ft. 80 Watt. and retails at £5 19s. 6d. (excluding lamp).

HERMAN SMITH LIMITED

PHONE DUDLEY 4211/3 RELIANCE WORKS · DUDLEY GRAMS · RELIANCE DUDLEY

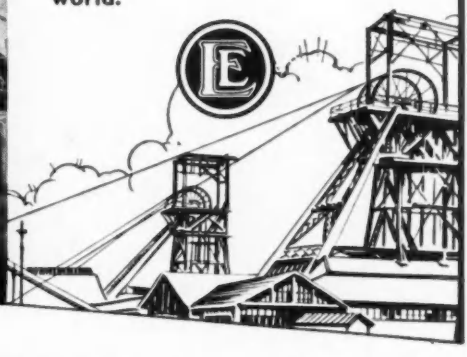






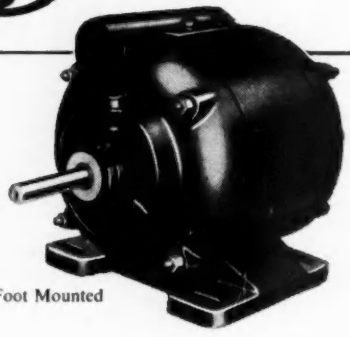
'ENGLISH ELECTRIC' *Hoists*

The English Electric Company with its specialised design and manufacturing experience extending over 40 years, offers expert advice on either A.C. or Ward-Leonard manually-controlled or automatic hoists for use in any part of the world.

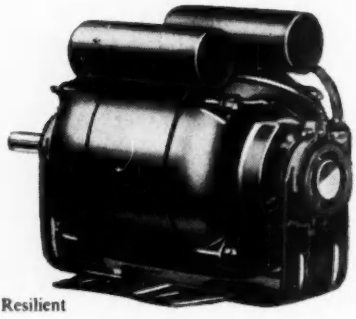


The ENGLISH ELECTRIC Company Limited
MINING DIVISION - - - STAFFORD
Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

Fractional Horsepower Motors



Foot Mounted



Resilient

Resilient with Belt-tension Adjuster

Capacitor Motors

Single-phase 1/6 to 1 H.P. up to 250 Volts
Full-load speed, 1425 r.p.m. at 50 cycles.

These A.C. motors are of the drip-proof pattern and made in two forms, capacitor start and capacitor start-run—suitable for refrigerators, oil burners, or other duties requiring high starting torque.

CONSTRUCTION—machines are sturdily built—cores are built up of high grade, low-loss insulated magnetic-steel laminations—rotors are of cast-aluminium, and are virtually indestructible in service.

BEARINGS—sleeve bearings for horizontal mounting and where ultra-quiet operation is required—ball bearings for fixing vertically, horizontally, or at any angle.

Other mountings—spigot (horizontal or vertical), ring mounted, or footless.

These motors comply fully with B.S. 170.

No manufacturer can offer a wider choice in fractional horsepower motors. Whatever the conditions of service or type of drive, there is a BTH motor well suited for the job.

BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON CO., LTD., RUGBY, ENGLAND

A 2907

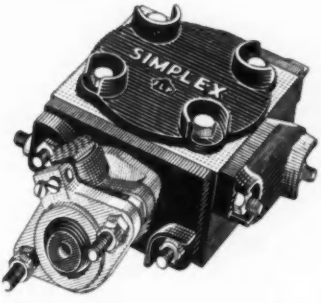
HERE IS THE

NEW

plug-in flameproof

lighting FLP system

(Patent applied for)



BUXTON CERT. NO. 2496

Complying fully with B.S.S. 229 and 889, the Simplex 'Antiflam' lighting system has been specially designed for use in mines where certified flameproof apparatus is required. It is suitable for use underground in roadways, pumphouses, sub-stations and stables

This new range is so flexible that extensions or reductions can easily be made in the minimum of time, and cut lengths of cable may be made off and sealed on the surface

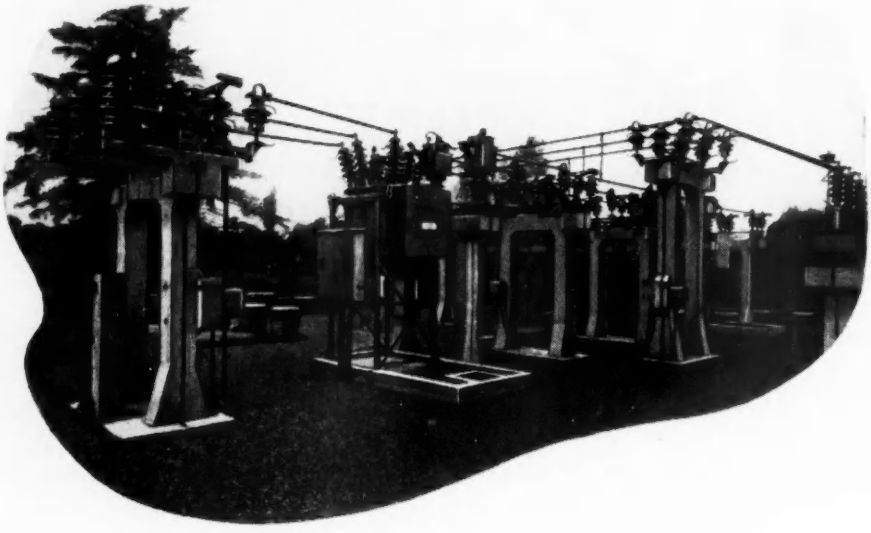
MADE BY THE HOUSE OF **Simplex**

For use in mines, railway yards, oil refineries, distilleries, paint works, chemical works, etc.

Write for further details: **Simplex Electric Company Limited Oldbury Birmingham and Branches**

A TI COMPANY

EASTERN ELECTRICITY BOARD
NORFOLK SUB-AREA
GREAT BRITAIN



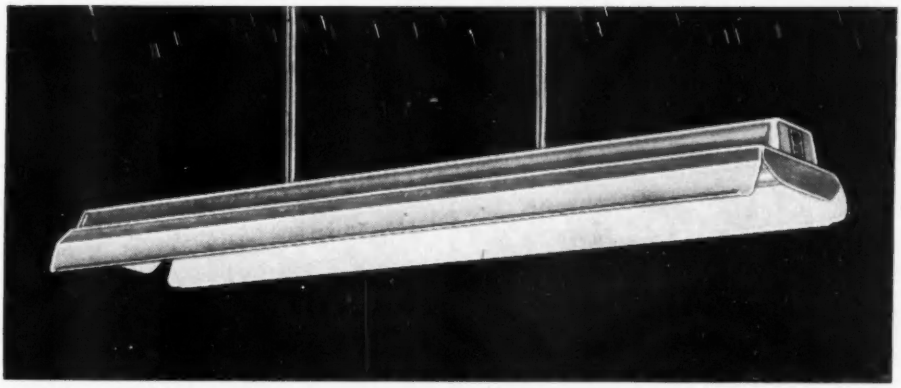
33-kV OUTDOOR-SUBSTATION Switchgear

CIRCUIT-BREAKERS
ISOLATING-SWITCHES
CURRENT AND VOLTAGE
TRANSFORMERS
CABLE SEALING-ENDS

MADE AT HEBBURN, CO DURHAM, ENGLAND

by

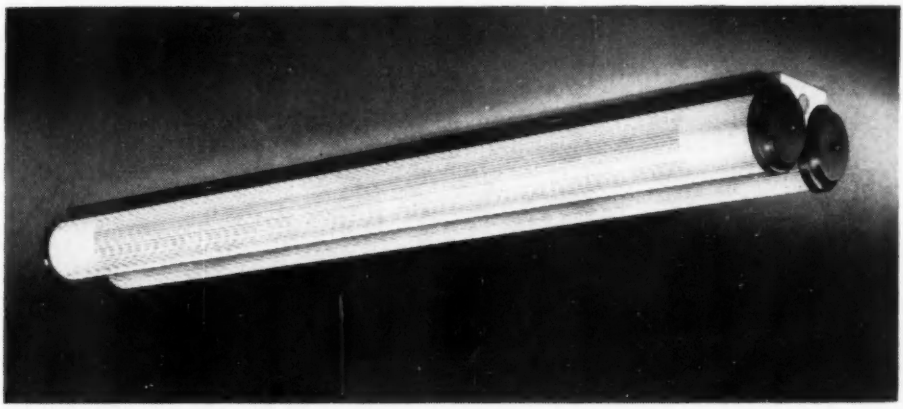
REYROLLE



F 67000 *(One 5 ft. 80w.) Trough reflector for pendant, ceiling or continuous trough fixing.* **Price £4.14.0** *(without gear)*

Fluorescent Fittings

by G.E.C.



Decorative Ceiling fittings with Real Bronze Colour end plates and reeded Perspex bends.

F 36531	*Arranged for* 2 80w. 5 ft. *lamps.*	**Price £15.18.8 each plus Purchase Tax £3.19.8**
F 36529	,, ,, ,, 40w. 4 ft. ,,	,, **£13.9.0** ,, ,, ,, ,, **£3.7.3**
F 36563	,, ,, ,, 30w. 3 ft. ,,	,, **£11.6.0** ,, ,, ,, ,, **£2.16.6**

All prices exclusive of gear and lamps.

THE GENERAL ELECTRIC CO. LTD. MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

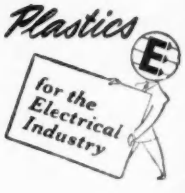
We should worry

why should you?

You and everybody else in electrical engineering want to be getting on with the job. The plastic mouldings you can leave to us. If there is anything you want, from a small motor housing to a switch assembled complete with pressings, turnings and wiring then we are your men. Ekco Plastics not only estimate, design and mould for any moulding job, but have the facilities for making and assembling metal parts and wiring if the moulding calls for these, too.

EKCO

Plastics

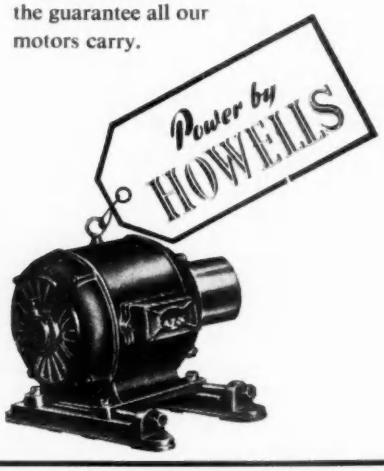


Consult Ekco Plastics Advisory Service on any moulding problem. You have only to telephone SOUTHEND 49491

E. K. COLE LTD. (Plastics Division)
SOUTHEND-ON-SEA

But now—

the Textile Industry relies on Howells Electric Motors. We build Electric Motors to last and to run efficiently with the minimum of attention. We know we succeed and our confidence in their reliability is apparent in the guarantee all our motors carry.



FOR THE TEXTILE INDUSTRY

HOWELLS (ELECTRIC MOTORS) LTD.
HANLEY, STOKE-ON-TRENT
Branches at: London, Manchester, Bristol, Birmingham, Glasgow

dm HE 39

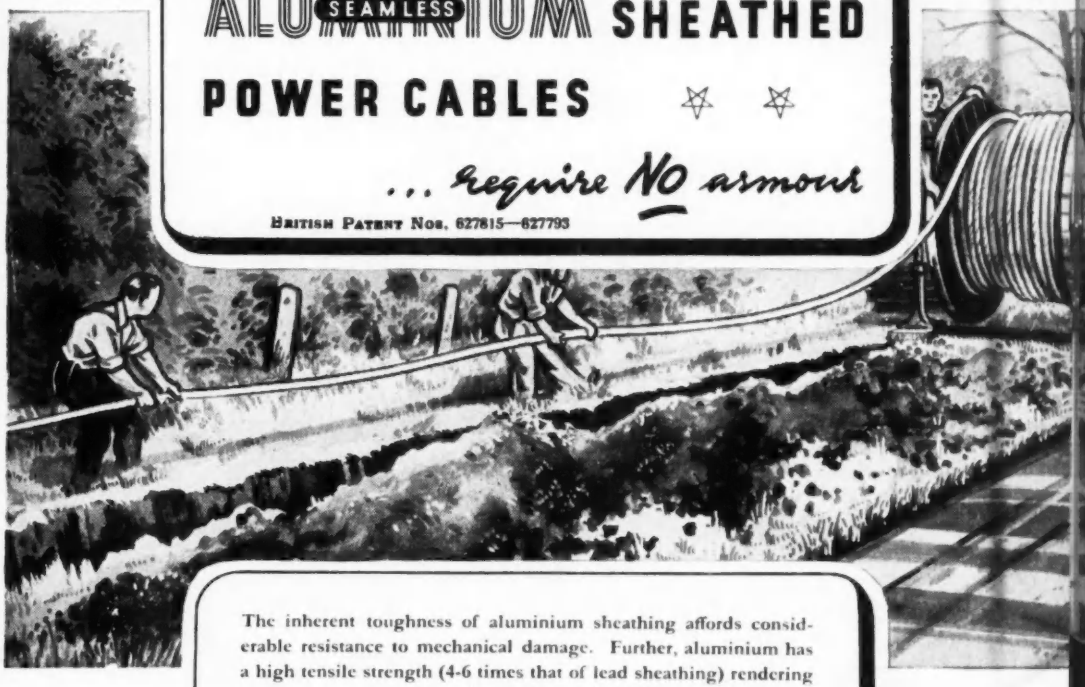
FOR INSTALLATIONS LIKE THESE . . .

J.& P.

ALUMINIUM SEAMLESS SHEATHED POWER CABLES

. . . require NO armour

BRITISH PATENT NOS. 627815—627793



The inherent toughness of aluminium sheathing affords considerable resistance to mechanical damage. Further, aluminium has a high tensile strength (4-6 times that of lead sheathing) rendering reinforcement for suspension-type installations unnecessary, and possesses great resistance to vibration and fluctuating stresses.

These properties permit unarmoured cable in many situations where the use of armour would be imperative with lead or lead alloy sheathing.

JOHNSON & PHILLIPS LTD.

CHARLTON LONDON S.E.7

The mark that means that "little more" in quality

The New SIERAY Class "A"

FLUORESCENT STREET LIGHTING LANTERN

by

SIEMENS

169 of these Lanterns have been recently installed for street lighting in NEWTOWNARDS Northern Ireland

MAIN FEATURES

Mounting direct to column without external bracket.
All Lamp Control Gear in lantern head.
75% of Lantern weight within 7in. of column.
Can be mounted on either steel or concrete columns.
Safety switch incorporated in lantern head.
Available for switch or instant start operation.

SIERAY *is the answer to* **YOUR** *lighting problems!*

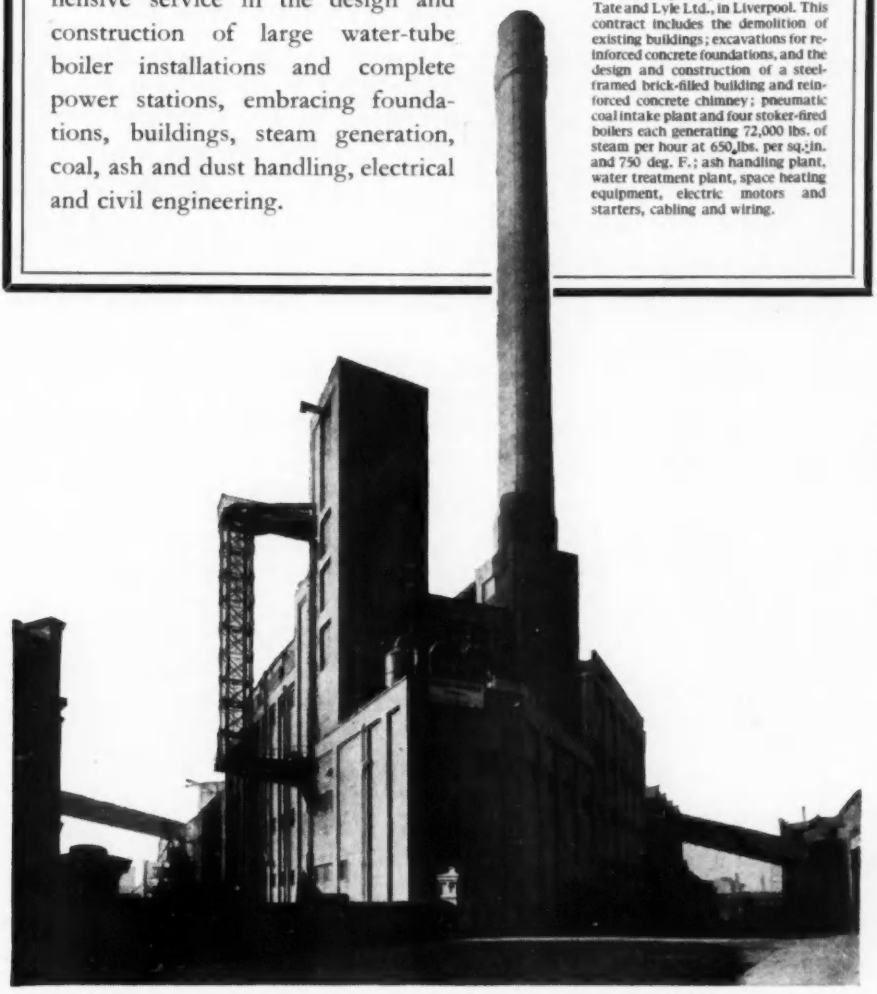
SIEMENS ELECTRIC LAMPS AND SUPPLIES LTD., 38-9 Upper Thames Street, London, E.C.4

Branches: Belfast . Birmingham . Bristol . Cardiff . Dublin . Glasgow . Leeds . Liverpool Manchester . Newcastle-on-Tyne . Nottingham . Sheffield

Designers and Builders of complete Steam Power Plants

Simon-Carves provide a comprehensive service in the design and construction of large water-tube boiler installations and complete power stations, embracing foundations, buildings, steam generation, coal, ash and dust handling, electrical and civil engineering.

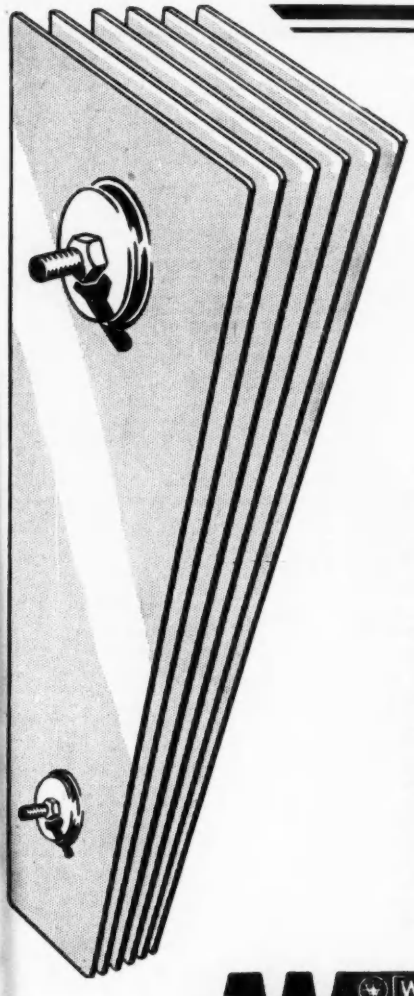
TATE & LYLE LTD, LIVERPOOL
The photograph shows a typical contract nearing completion for Messrs. Tate and Lyle Ltd., in Liverpool. This contract includes the demolition of existing buildings; excavations for reinforced concrete foundations, and the design and construction of a steel-framed brick-filled building and reinforced concrete chimney; pneumatic coal intake plant and four stoker-fired boilers each generating 72,000 lbs. of steam per hour at 650 lbs. per sq. in. and 750 deg. F.; ash handling plant, water treatment plant, space heating equipment, electric motors and starters, cabling and wiring.



Steam power by **Simon-Carves Ltd**

SIMON CARVES GROUP

STOCKPORT ENGLAND



TOWERING ABOVE ALL OTHER TYPES

by their supremacy in rectifier performance, Westinghouse "Westalite" metal rectifiers are a sure and solid foundation on which to build. Electrolytic cleaning, etching and stripping, sulphuric and chromic acid anodising, gold and silver gilding, nickel and chromium plating and all other electro-deposition processes for which rectifiers whose outputs total over 4½ million amperes have been supplied, battery charging, power for machine tools, vibrating screens and lifting magnets are but a few of their numerous applications. Certainly no others serve industry so well or can approach the unfailing reliability and efficiency of

WESTINGHOUSE
WESTALITE
METAL RECTIFIERS

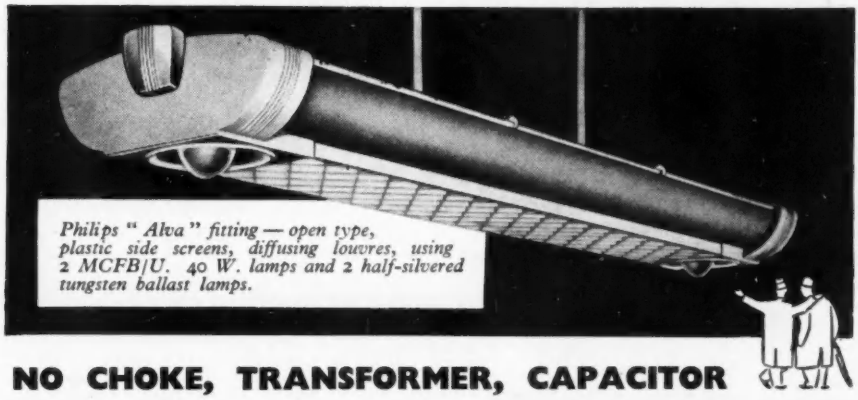
For an index of applications write for Data Sheet No. 1 to Dept. E.T.1

WESTINGHOUSE BRAKE & SIGNAL CO. LTD.

82 York Way, King's Cross, London, N.1

FOR SHOPS, OFFICES, SHOWROOMS, HOMES . . .

Instant-self-start
FLUORESCENT LIGHTING WITH NO AUXILIARIES



Philips "Alva" fitting — open type, plastic side screens, diffusing louvres, using 2 MCFB/U. 40 W. lamps and 2 half-silvered tungsten ballast lamps.

NO CHOKE, TRANSFORMER, CAPACITOR OR STARTER WITH NEW INSTANT-START LAMP

Philips Instant-Self-Start Fluorescent Lighting System provides a number of advantages for installations where instant lighting is required. The new fluorescent lamp operates in series with a Philips Coiled Coil Tungsten Ballast Lamp to give a pleasing blend of fluorescent colour plus the "punch" of tungsten light, and the system combines long service life with an efficiency of about double that of tungsten lamps.

PHILIPS

PHILIPS ELECTRICAL
LIMITED

LIGHT GROUP, CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

Manufacturers of: *The Dependable Radio . Television Receivers . Lamps and Lighting Equipment "Philishave" Electric Dry Shavers . Cycle Dynamo Lighting Sets . Amplifiers, etc.*

Other branches and depots at: BIRMINGHAM, BLACKBURN, BRISTOL, CARDIFF, EDINBURGH, GLASGOW, LEEDS, LIVERPOOL, LONDON, MANCHESTER, NEWCASTLE-ON-TYNE, NOTTINGHAM, PORTSMOUTH, SHEFFIELD.

(LD 769)
B

TEMCO Switches

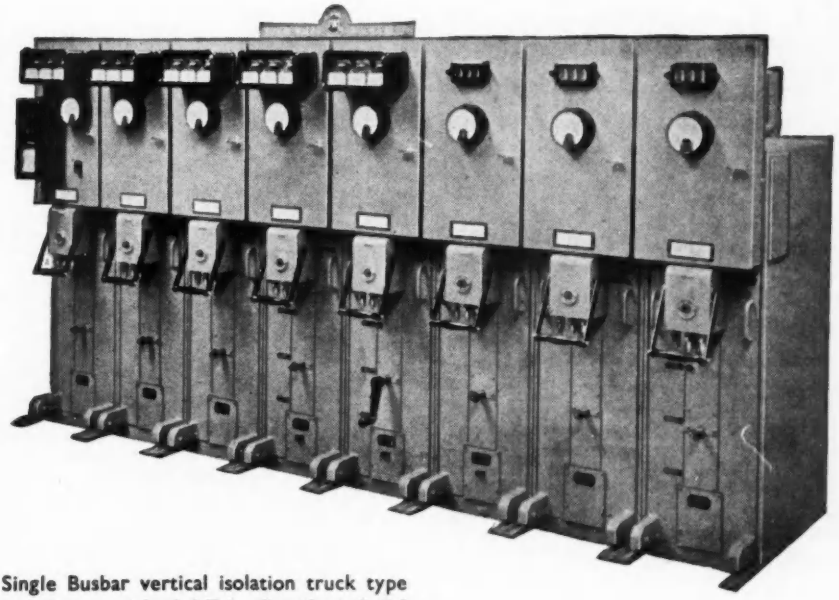
TEMCO Switches comply with B.S.S. 816 and are made to the same high standard of quality as all TEMCO Accessories. The quick make-and-break underslung action is semi-positive and the spring contacts are self-adjusting. The base is of best quality porcelain, while the dolly and cover are moulded. The dolly has no metal insert. Supplied in surface, semi-recessed and flush patterns in brown on white, all brown, or all white finishes. Switch plates up to four gang in brown or white available for use with flush Switches. Complete Accessory Catalogue available on request.

T. M. C.-HARWELL (SALES) LTD

37 UPPER BERKELEY ST., LONDON, W.1 *Telephone:* Paddington 1867-8-9

S·W·S

AIR INSULATED METALCLAD SWITCHGEAR



Single Busbar vertical isolation truck type switchgear with A.S.T.A. Certificated Oil Circuit Breakers for 6.6 or 11kV. Normal current ratings up to 800 amp, 150 MVA or 1600 amp, 250 MVA.

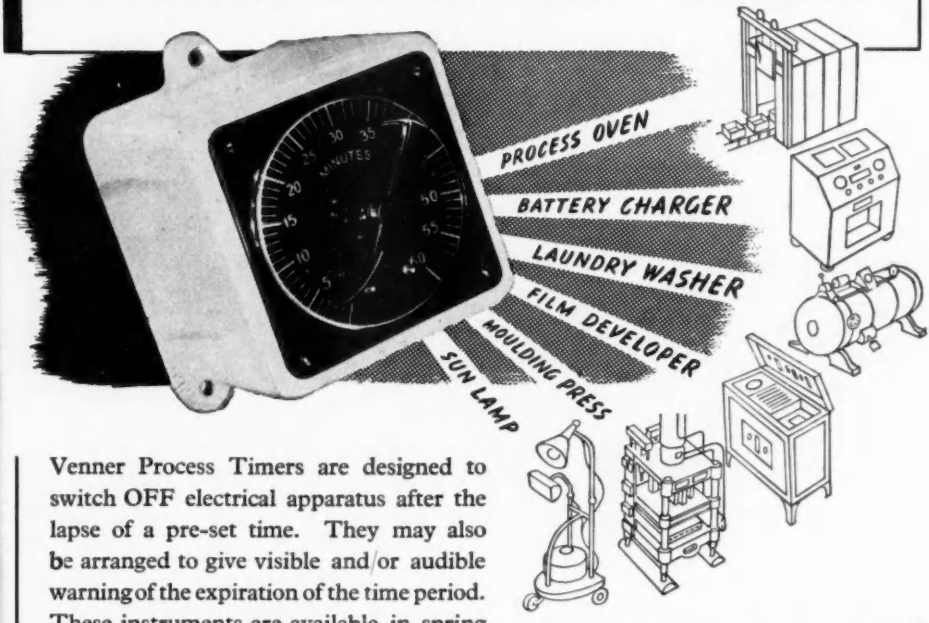
SOUTH WALES SWITCHGEAR LTD. BLACKWOOD MON.

LONDON OFFICE NINETEEN WOBURN PLACE, W.C.1

Represented in all the principal countries of the world

Time Control of PRODUCT FINISHING, PLASTIC MOULDING, HIGH FREQUENCY HEATING, COOKING EQUIPMENT, LAUNDRY WASHERS, DEGREASING PLANTS and INSTRUMENT STERILIZATION.

VENNER PROCESS TIMERS



Venner Process Timers are designed to switch OFF electrical apparatus after the lapse of a pre-set time. They may also be arranged to give visible and/or audible warning of the expiration of the time period. These instruments are available in spring or motor driven types, for surface or panel mounting, and can be supplied in a variety of time ranges.

WRITE FOR LEAFLET T.S.20/ET.

We also specialise in Time Switches, Synchronous Motors, Programme Ringers, Stop Watches, Hour Recording Meters, Prepayment and House Service Meters, Delay Relays and Master Pendulum Clocks.

There is a VENNER *time switch for every purpose!*

VENNER Time Switches Ltd.

KINGSTON BY PASS, NEW MALDEN, SURREY. *Telephone:* MALden 2442 (9 *lines*)

ELECTRICAL TIMES

Vol. 119 No. 3087 THURSDAY, 4 JANUARY, 1951

PUBLISHED EVERY THURSDAY

SIXTIETH YEAR OF PUBLICATION

BLACKWALL POINT POWER STATION 3
YARDSTICK FOR CIRCUIT-BREAKERS *by H. Trencham, M.I.E.E., M.Inst.C.E.* .. 4
THE "LEPETH" CABLE SHEATH 8
METAL CONTROL 8
ELECTRIC HEATING SPEEDS ALUMINIUM PRODUCTION 9
ELECTRICAL MATERIALS INDEX 10
PROBLEMS AND PRACTICE IN ENGINEERING 11
TROUBLES—AND REMEDIES, No. 4, SYNCHRONOUS MOTORS, by *S. Spence, B.Sc.* 13
NEW YEAR'S HONOURS 17
OVERSEAS NEWS 18
PERSONALITIES IN THE INDUSTRY 20
PROGRESS IN PRODUCTION No. 1 23
CROSSWORD PUZZLE SOLUTION 26
THE BUYER'S COLUMN 27
THE WEEK IN NEWS 29
Electric Supply News 34
Company Activities 35
COMMERCIAL INFORMATION 36
CLASSIFIED ADVERTISEMENTS *43*
INDEX TO ADVERTISERS *50*

SUBSCRIPTION RATES.—United Kingdom and Overseas £1 17s. 6d. per annum. Canada C$6 50c., U.S.A. $5 50c. per annum. Subscriptions are payable in advance and may commence with any issue throughout the year. Overseas subscriptions may be paid to The Electrical Times Limited by banker's draft, cheque or international money order. Single copies 6d. each.

OFFICES — SARDINIA HOUSE, SARDINIA STREET, LONDON W.C.2
Telephone - HOLborn 6016 Telegrams - Equivolt, Estrand, London

Hot Water—

always!

by

G.E.C.

Electric

WATER HEATERS

Domestic and Industrial

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

THE PUBLIC CORPORATION

WITHIN the Statute Book there is to be found a reflection of the evolution that has taken place in political thought on nationalised organisations since the war, and this development has been so rapid that it is scarcely too much to say that if the Electricity Act had been passed in 1949 instead of 1947, the constitution of the B.E.A. would be radically different. But, despite the considerable experience gained in the structure of public corporations, there still remain doubts on the most satisfactory form for their internal organisation and supervision. It is opportune, therefore, that these essential problems are being made the subject of a special study, and 12 research papers are being prepared by the Acton Society Trust, a body devoted to the objective study of political forces and structures.

TEST FOR EFFICIENCY

THE first of these papers, on Accountability to Parliament, has now been published and presents a lucid objective account of the difficulties of adequate supervision of public corporations. The conclusion that Parliament has neither sufficient time, information nor experts to supervise adequately the nationalised industries cannot be gainsaid, but the legion of possible remedies that have been put forward do little more than confirm the obscurity of a satisfactory answer. Indeed, the paper actually questions whether the public corporation is itself satisfactory, since it has inherited the worst of both worlds in the field of accountability. If there is any straightforward answer to this paradox of adequate supervision without fettering the administration, surely it will be found in the corporations applying their own test of efficiency and setting forth the results of such tests in a clear objective manner that will still the voice of criticism, and lull Parliament's fears of its own offspring. The nature of such a test is not easy to define, but since the corporations themselves do not appear to be exploring this approach, it would seem worthy of a special study by the Acton Society.

SEARCH FOR SUBSTITUTES

THE DRASTIC limitations to be imposed on the usage of zinc, which were announced last week, do no more than reflect the seriousness of the shortage. It is too early to assess what the cut of 40% in overall supplies will mean to electrical manufacturers, since there are unknown variables in the shape of demand for armaments, saving due to prohibition of use for consumer goods and finally the reaction of producers to their responsibility for determining their own order of priority of customers. It is those manufacturers who will be prevented from using zinc, or more important, its ally brass, in electrical accessories and appliances, that will be the first to suffer, particularly those making kettles and percolators. The search for a substitute material will not be easy since copper is already prohibited and the second obvious choice, aluminium, is already in short supply, and may itself be subject to control within the next few months. Steel may be an alternative for certain applications, but the shortage of nickel imposes a limit on those wishing to adopt chromium plating. Such are the difficulties of those who seek a substitute in a world of shortages and although an answer may eventually be found, a severe reduction in the present production of those appliances affected is inescapable.

CABLE SHEATHS

THE "LEPETH" or lead-polyethyline sheath described elsewhere in this issue is an interesting development for conserving lead, so far as communication cables are concerned. It would be comforting to think that it could be applied to power cables, but unfortunately there seems little prospect of such an achievement. Polythene is limited in its temperature rise, and it is by no means cheap. Also, its extrusion in the sizes necessary for power cables would present considerable production problems, being beyond the capacity of commercial extruding machines, and requiring something after the fashion of a modified form of lead press. Furthermore, if any real saving in lead is to be accomplished, the thinness of the sheath might cause mechanical troubles in the actual bending and handling. There is also the matter of the current that the sheath is expected to carry without damage. True, that could be overcome by metallic tapes in contact with the sheath, but this would add further unwelcome complications. It seems then, that the "Lepeth" sheath, however valuable it may be in the communications field, is going to be very little assistance to the power cable industry.

FUTURE DEVELOPMENTS

NEVERTHELESS, there must be much interesting research work taking place in manufacturers' laboratories, in an attempt to overcome the lead shortage. Aluminium at one time seemed the obvious answer, and we still feel that it offers the brightest prospects. Even though aluminium itself seems likely to be in short supply, it may not be quite so scarce as many other materials. It has even been suggested that we should see a revival of the vulcanised bitumen sheath which the first world war fostered. This we find difficult to believe, since it had many disadvantages. Furthermore, vulcanisation implies the use of sulphur of which there is already an acute shortage. If aluminium supplies can be maintained—if necessary by the substitution of magnesium in other situations wherever it may be suitable and a really satisfactory answer can be found to the problem of direct extrusion on to the cores, it would seem to be the most practicable solution to the cable sheath problem.

A.V.C.

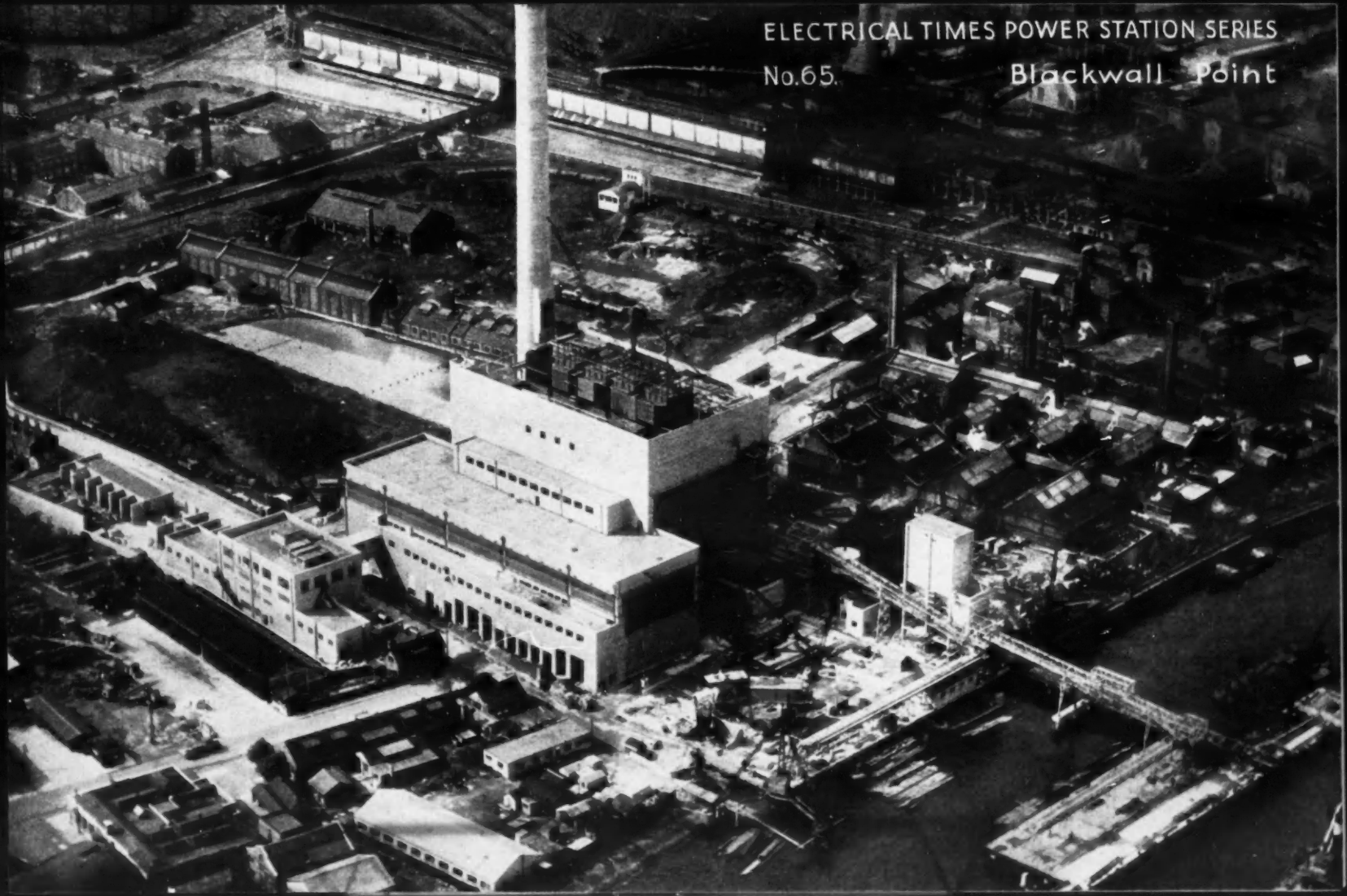
THE RECENT I.E.E. discussion on broadcast radio receivers, while interesting, appears to have omitted one development which is, in our experience, highly desirable. We can dispense with push-button tuning, magic-eyes and other gadgetry, but we should like someone to invent a kind of automatic volume control which could differentiate between speech and music and give us the reasonable sound levels in both which appear to be impossible of attainment in transmission. If, in a mixed programme of speech and music, one could have the speech at a reasonable level of audibility without musical interludes necessitating a frenzied dash to turn down the volume before the windows rattle, it would be a notable step forward in listener-comfort.

Meteor

THIS WEEK'S PHOTO

BLACKWALL POINT power station, in the London Division of the British Electricity Authority, is in an advanced stage of construction, and is expected to be in commission in May, 1951. The station has been planned to accommodate three 30,000 kW turbo-alternators, each generating at 11 kV, and which will operate at 3,000 r.p.m. with a steam pressure of 600 lb/sq in. and a temperature of 850° F. Three pulverised fuel fired boilers each with a capacity of 365 klbs per hour evaporation, will operate at a steam pressure of 635 lb/sq in. and a temperature of 875°F. Coal, which will be delivered by colliers to a jetty 200 ft long by 70 ft wide, constructed in the River Thames at East Greenwich, will be conveyed by belt and gravity bucket conveyors into the boiler coal bunkers. A chimney 365 ft high has been constructed, with the necessary electrostatic precipitators situated on the boiler house roof.

The 11 kV generated voltage will be transformed to 33 kV and distributed directly into the London Area Board's 33 kV network. A remarkable feature of the construction of this station is that it has been confined to a total working area of three acres.


ELECTRICAL TIMES POWER STATION SERIES
No.65.
Blackwall Point

Yardstick for Circuit-Breakers

The Need for Agreement on RRRV

By H. TRENCHAM, M.I.E.E., M.Inst.C.E.*

A GREAT deal of attention has been given in recent years, particularly on the Continent of Europe, to inquiries into the rates of rise of restriking voltage which occur in the operation of circuit-breakers on high voltage a.c. power systems, with the apparent object of defining standard requirements for circuit-breaker performance.

This rate of rise as a factor in circuit-breaker operation was recognized many years before any suggestion was made that standards should be established for circuit-breaker rating, and consequently, it is of interest to enquire, first as to its significance, i.e. to determine why it has become of importance in circuit-breaker design and application and, second (if standardisation is desirable) to know what conditions may establish the suitability of such standards as may be chosen.

It must first be pointed out, however, that the discussion relates to the rates of rise of restriking voltage which are inherent in the system and which are derived from parameters imposed by it solely. These rates would be shown across the terminals of a perfect circuit-breaker, i.e. one which could introduce infinite resistance in the break at exactly a current zero. The performance exhibited by a circuit-breaker will be influenced by its own characteristics, and the effects of post-arc conductivity or the occurrences resulting from current chopping will be superimposed on the condition inherent at the point of installation.

Operating Significance

It has been found that the characteristic of any circuit-breaker, when the rate of rise of restriking voltage is plotted against maximum MVA that can be broken at a given voltage, is a curve which resembles a hyperbola. The performance exhibited by a breaker will thus depend upon the position along this characteristic curve at which the duty is being done. In other words, the breaking rating of a circuit-breaker, if it be stated in volts and amperes only, is not complete, and may, indeed, be quite inadequate; and the rate of rise of restriking voltage is a third variable which may be significant, depending on the circuit-breaker characteristic and its relation to the duty required.

It is this circumstance which has given rise to frequent misunderstandings regarding comparisons between air-blast and oil circuit-breakers.

It has been said that an air-blast circuit-breaker is sensitive to the rate of rise of restriking voltage, but this statement is incomplete and should be amplified to gain a clear understanding of the position. At low rates of rise of restriking voltage, the change of MVA with change of this rate is rapid and the statement is true; a corollary to this is that in this region a statement of breaking capacity in terms of volts and amperes is incomplete and a rate of rise must also be given. For fast rates of rise of restriking voltage, the MVA falls asymptotically to a limiting value and it changes only slowly with the change in rate, so that volts and amperes will then suffice for defining breaking capacity with sufficient accuracy for practical purposes.

Similarly, the assertion that the oil circuit-breaker is insensitive to rates of rise of restriking voltage is only relatively true. It so happens that in the most usual applications of oil circuit-breakers the performance lies along that part of the characteristic curve where change of MVA is slow in relation to change in rate of rise of restriking voltage and the comment is correct. When, however, this rate of rise is fast and the current is low in value, the arcing times, as is well known, are longer and indicate greater sensitiveness.

The reason for the different performances of the two types of breaker is easily seen. In oil circuit-breakers the principal gas produced by the action of the arc is hydrogen, and with its high mobility and specific heat, the blast produced by it is faster and more effective than a blast of air. When, however, by reason of low

*Consulting Switchgear Engineer, B.T.H. Co. Ltd., Willesden.

current, the amount of gas produced is small, its effectiveness is correspondingly reduced.

In oil circuit-breaker applications we can thus afford generally to neglect the rate of rise of restriking voltage of the system, because the breaker is naturally adequate to deal with even more than the maximum that is likely to occur. The air blast breaker is not necessarily independent of this factor, however, and though it may be made so by the use of resistance switching, the cost is justified only in special instances.

Resistance Switching

A further word regarding resistance switching may be of interest before leaving the subject of operating significance. The value of the resistance chosen and its effect will vary with the constants of the circuit to which the breaker is applied, and in the air-blast breaker this value should be based on the conditions of full breaking rating. The oil circuit-breaker, however, when breaking the full rated current does not require any aid to deal with the restriking voltage and, being sensitive to this factor at only a comparatively small fraction of its fully rated current, the shunting resistance should be proportioned for damping a circuit whose constants correspond with this reduced current. With such a resistance the oil circuit-breaker can be made to break circuit with a constant arc length throughout its full range of operation.

Standardisation of R.R.R.V.

The operating characteristic of air-blast circuit-breakers can be held to explain why standardisation of rates of rise of restriking voltage is desirable. The rates of rise which are commonly found in power systems are of that order of magnitude for which change in the rate will strongly affect the breaking capacity rating of the air-blast breaker; and this rating, therefore, is incomplete until the rate of rise of restriking voltage appropriate to the volts and amperes of its breaking rating is quoted.

It is obviously impossible economically to build all circuit-breakers for the highest value of rate of rise of restriking voltage which the worst point of any systems may produce, and there should, therefore, be agreement as to what rates should apply to the economical standard circuit-breaker.

System Conditions

There have been various tentative proposals put forward relating to rates of rise of restriking voltage as international standards for the rating and testing of air-blast circuit-breakers, but examination of them has not shown any logical connection back to fundamental principles. They appear to have been based on measurements which have been made on existing systems, and do not take care of possible future conditions. System constants and operating conditions will decide the rates of rise actually to be met with in any location on a system, but it should be possible, as well as being obviously desirable, to base any figures contemplated for standards on principles which take the contributing factors into account in a manner which is of general application.

System conditions will change during day-to-day operations: further, the range of the possible change will alter with system development, and it seems logical, therefore, to try to assess, as a starting point, what might be considered the ceiling conditions of rates of rise of restriking voltages on systems which have been developed to their full capacity. If such ceiling values could be found they would be useful as datum points from which practical values could be derived for rating and testing purposes. Thus if the ceiling value be taken as 100% of rated voltage it might prove practicable to adopt say 60% for standard breakers of economical design. If, on the other hand, opportunist standards are adopted based on present day conditions of growing systems, the operating engineer may, in a few years' time, find his circuit-breaker problem to have become an exceedingly involved and intricate one, with no yard stick available to guide him in his work.

A ceiling value of the rate of rise of restriking voltage implies also a ceiling value of the recovery voltage, viz 100% of rated voltage. If a fault current were great enough to pull down the recovery voltage materially, the rate of rise, during the transitory condition leading to that recovery voltage, would be similarly affected: ceiling conditions, therefore, envisage that there will be no reduction in the recovery voltage due to the fault, and further, that the power factor is zero.

Reference has been made to systems which are developed to their full capacity, and the reason for this stipulation should be understood. It is accepted that the rates of rise associated with full breaking ratings are slower than those occurring when faults of lower value are experienced on the same system, and it is sometimes assumed that this slowing down of the rate of rise will also follow any increase in short-circuit value occasioned by system growth, whereas the opposite is, in fact, the real tendency, as found in practice.

Reducing Short-Circuit Values

When generating capacity is added to a growing system operating at a given voltage, there will be an increase in the possible short-circuit values and eventually, in order to keep these within reason, the system must be split into sections which can be interconnected at a higher voltage through the reactance of the transformers involved. Such a higher voltage network may in its turn form part of a still greater system which is linked together at yet a higher voltage.

This method of interlinking can achieve the object of keeping down the short-circuit values on the original system to reasonably constant values, but the restriking voltage values and their rates of rise, for a given MVA of fault, will increase with added plant capacity, and with them the severity of the duty on the circuit-breakers will also grow.

Consider Fig. 1 as representing conditions which might be met typically in a substation forming part of a large system. With a fault at X and switching conditions as at (a) there will be a comparatively low short-circuit current, but a high rate of rise of restriking voltage across breaker A which has to clear it, because the reactance of the single transformer is associated with a minimum of capacitance.

With a fault at Y and switching conditions as at (b), i.e. no incoming feeds at busbar voltage, there will be a higher fault current, but with a lower rate of rise of restriking voltage across breaker B because there is now associated with the reactance and capacitance of the transformers the additional capacitance of busbars and connections. N.B. It may be worth noting here that the natural frequency of the restriking voltage of similar transformers in parallel will be the same as that of one only, because the product of L and C will remain unchanged, thus L x C equals $\frac{L}{N}$ x CN and further, that the smaller this product the higher will be the natural frequency, from the well-known formula:—

$$f = \frac{1}{2\pi \sqrt{LC}}$$

With a fault at Y and switching conditions as at (c), i.e. power incoming at busbar voltage through feeders C and D, the short-circuit current to be cleared by breaker B will be increased over that at (b) by the amount fed through breakers C and D, but the rate of rise of restriking voltage will be lowered by the added capacitance of the incoming feeders.

Take now a condition in a larger system wherein the amount of the short-circuit current contributed by feeders C and D could have been supplied by one of them only; there would be a higher rate of rise of restriking voltage for the same short-circuit current because the capacity of one of the feeders would be absent, and this same higher rate of rise would be maintained if a still larger fault current were fed by the system along the one incoming feeder. Hence the ceiling rate of rise of restriking voltage must envisage maximum feed through every source, i.e. a fully developed system.

Amplitude Factors

The formula quoted above, for natural frequency, is modified in its incidence by the effect of resistance, acting as a damping agency. Without this damping action the inherent oscillation of the restriking voltage would swing to twice the value of the impressed recovery voltage, whereas the actual peak value of the restriking voltage, depending on the amount of the damping resistance and the natural frequency of the particular circuit in which it lies, will be lower. Rates of rise calculated from natural frequencies must thus take into account the possible value of the recovery voltage and also the amplitude factor of the restriking voltage, i.e. the ratio between the peak value of the latter and that of the former, which must obviously be less than 2. Any standard natural frequencies would, therefore, entail the acceptance of some standard amplitude factors. Values varying from 1.2 to 1.8 have been discussed from time to time.

It should be noted that a low amplitude factor will usually be associated with a high natural frequency because of the greater effectiveness of damping by a given resistance at higher frequency, and conversely, a high amplitude factor is likely to occur with low natural frequency. The extremes provide the conditions of two possible kinds of breakdown or restrike; first, that associated with sensitiveness to high rate of rise immediately following the current zero, and the second, a more purely voltage phenomenon, when breakdown occurs later because of the high peak value reached in the lightly damped circuit.

Practical Standardisation

It is clear that whatever value may, at a given location, be regarded as an appropriate rate of rise of restriking voltage for full rated breaking capacity, this rate will be exceeded at smaller amounts of fault current because, when the short-circuit duty is diminished by switching changes, or by the position of the fault, the reduction in the amount of capacity relative to

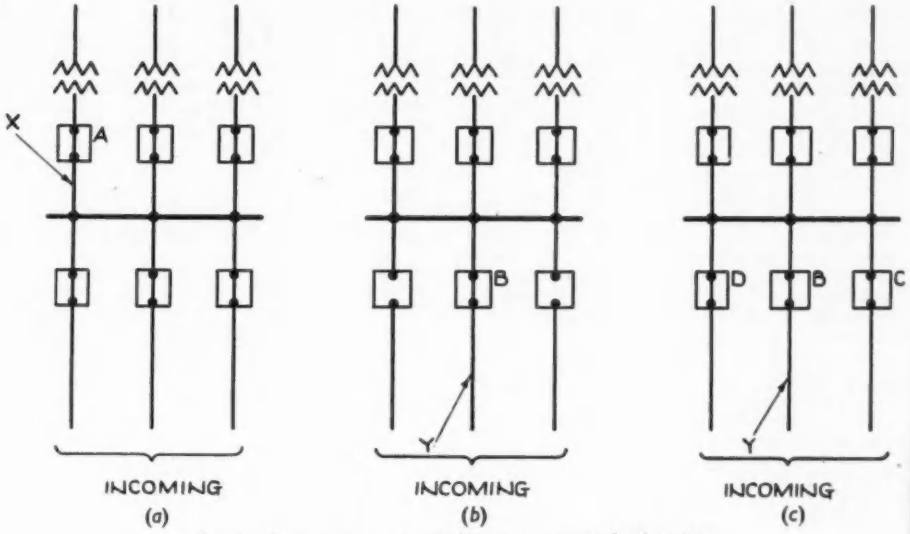


Fig. 1. Alternative system conditions on a typical substation

inductive reactance will cause their product to be reduced and the natural frequency, therefore, increased.

The problem of ascertaining ceiling values for standardisation is, therefore, a twofold one; firstly, to ascribe the rational value which should apply at 100% breaking rating and then to determine by what factors these are to be increased at typical fault values less than 100%, say, for example, at 60% and at 30% of maximum breaking capacity.

As regards the amplitude factor to be chosen as representative, it would seem that this should not be a too-high figure when considered with the natural frequency of the circuits involved, because, if chosen too high, it may have the effect of removing the restrike from the region of current zero, where the rate of rise seems to be the decisive factor,* to a later time when a more purely voltage breakdown may take place. The point should not involve practical difficulty if a suitable figure be chosen in terms of inherent rate of rise of restriking voltage expressed in volts per micro-second, as this may then be equally representative of a high natural frequency with heavy damping or a lower natural frequency with light damping. A statement of the peak value reached by the restriking voltage is necessary in any event, to complete the rating.

It is, of course, well known that the performance of circuit-breakers shows a very wide spread even under conditions of the closest control, so that there is no exact quantitative statement which can be made on their actual sensitiveness to rate of rise of restriking voltage. As the variation due to this factor is embraced, along with the effect of any other variables, within the known records of performance, it is a fair assumption that the phenomenon is not sharply critical. It is not, therefore, irrational to suggest that a formula need not necessarily be of a precision character and as, further, the possible ceiling values arrived at would also be subject in application to some arbitrarily chosen economic factor, we require only a formula which will give a curve with the right general characteristic in order to have the means of achieving reasonable co-ordination in circuit-breaker rating.

The general form of the curve representing the ceiling value of restriking voltages, if plotted against system magnitude, will show a gradual approach to some broadly recognisable maximum value. An examination of published information seems to indicate that it will be reasonably well defined for 100% breaking capacity ratings by using the fourth root of the MVA breaking capacity for the basic variable term.

Again consulting available information, it would appear that the ceiling rates of rise for fractional breaking ratings, say 60% and 30% will require that the actual voltage be taken into account. A correction factor derived from the sixth root of the voltage seems to fit the case with an acceptable degree of accuracy.

*See *The Engineer*, Vol. 187, P. 420. April 15th, 1949.

THE "LEPETH" CABLE SHEATH

DEVELOPMENTS made jointly by Western Electric and Bell Telephone laboratories in new types of sheath for communication cables are described in the November issue of *Electrical Engineering*. Stimulated by the shortage of lead, the "Lepeth" sheath applied to buried toll telephone cables consists of a polythene sheath about 0·075 in. thick extruded over the core, and covered with a thin lead sheath. A sandwich of thermoplastic cement is applied between polythene and lead, this serving as a seal between the two, preventing leakage from gas-filled cables and restricting the ingress of moisture, in case of a fault in the lead sheath.

Application

Manufacturing methods so far established use a commercial extruder for the polythene, which is applied over the warmed, dried paper-insulated cores. The extruder head is followed by cooling troughs, after which the thermoplastic cement is applied immediately before the cable enters the lead press. A considerable amount of work resulted in the installation of a Pirelli continuous press, and the use of a lead-silver rather than lead-antimony alloy. Containing only about 0·01% of silver, this alloy has adequate tensile and fatigue characteristics for buried cable work, and its creep properties are superior to the normal antimonial alloy. In addition it renders possible much higher extrusion speeds.

Outer coverings vary according to the service conditions expected, but that most commonly met with is the M.T.A. or modified tape armouring, which consists of a layer of 0·01 in. lead tape alternated with 0·012 in. paper tape; a layer of 0·01 in. steel tape and an outer layer of two 0·02 in. steel tapes. The lead and paper tapes are intended to protect the sheath from damage by the armouring during installation. Jute wrapping and asphalt compounding are also added.

Advantages claimed for this method of construction include particularly good immunity to lightning troubles, due to the high dielectric strength between cores and sheath which the polythene provides. It is also stated that its adoption has resulted in a reduction in costs.

METAL CONTROL

IN order to conserve the present inadequate supplies of zinc and copper for re-armament and other uses important to the country's economy, it is the intention of the Government to prohibit (by Statutory Order) the use of zinc, brass, or copper in the manufacture of certain articles which are regarded as unjustifiable in the present circumstances. Items which directly affect the electrical industry are as shown in the list.

The date upon which the proposed Order is to come into force is February 1. Meanwhile in the application of the limited supplies of zinc available in January, manufacturers are asked to discriminate as far as practicable in accordance with these views, and to give preferential treatment to applications in which zinc or brass are used in small quantities for goods of high conversion value, such as scientific instruments.

Allocations

The quantities of zinc available for distribution to purchasers from the Ministry (who have been individually notified) are approximately 60% of the average monthly allocation over the first nine months of 1950, the actual figures being: Ordinary (for galvanising and brass) 50%; electrolytic (for brass) 85%, (for rolled zinc products and zinc oxide) 70%; high purity (die-casting) 85%. Die casters are asked to make a proportionate distribution to their customers.

If possible, it is desired to avoid a detailed allocation scheme, and it is pointed out that this can only be done with the co-operation of manufacturers. It is pointed out that the supply position has been aggravated by a falling-off in the amount of scrap available, and controls are proposed on both price and supply of scrap zinc, copper, and lead, licensing being re-instituted.

Partial list of articles in which zinc, brass, and copper are prohibited:—

Bodies and lids of electric kettles, saucepans, coffee percolators, waffle plates, and similar cooking and portable water-heating appliances.
Conduit and fittings.
Fan blades and guards.
Lamp caps of certain sizes and types.
Lighting reflectors, shades, galleries and shade carriers and suspension chains.
Conduit bushes and fittings (for civil use).
Ornamental lighting fittings of all types.
Table and standard lamps.
Reflectors, guards, and ornamental parts of electric radiators and bowl fires.
Switch, socket, and bell-push plates.
Tumbler switch covers.
Wiring clips and non-current-carrying parts of fittings and accessories.
Junction box covers.
Galvanised tubes and fittings, except for water services, naval use or refrigeration.
Galvanised sheets, except for food tanks and containers, drinking water tanks, naval and overseas use, and fire-fighting equipment.
Fully galvanised wire except for wire ropes, aerial, mining, and Admiralty pattern cables, submarine cables and applications where armouring is left bare.
Wiped galvanised wire, except for telephone, telegraph and earthing wires and cable armouring.
Tar buckets, manhole covers and wire guards for machinery.

Electric Heating speeds Aluminium Production

Large-scale Resistance Furnace Installation at Rogerstone

IT is, of course, impossible in a general article on a large and complex modern plant, to consider in detail all the interesting electrical facets. Thus in an article on the Northern Aluminium Co.'s new rolling mills at Rogerstone, near Newport, only passing mention was made of the two large pre-heating furnaces which raise the temperature of the ingots up to a point suitable for the hot rolling process.

These furnaces are, nevertheless, of considerable interest electrically, as far as both the heating and the instrumentation are concerned. They were supplied by G.W.B. Electric Furnaces of Dudley, and are of the semi-continuous pusher-type in which the ingots are put in at one side, pass slowly through and are removed on to the hot rolling line at the other, the furnace doors being opened and closed for the entrance and egress of each ingot.

General Description

Each furnace is 57 ft 8 in. in internal length and the construction is of mild sheet steel on a steel frame. The arched chamber is lined with insulating material faced with first grade refractory and divided by ring arches into six heating zones.

Resistance heating is employed, the elements being suspended from the roof of each heating chamber. Some idea of the size of the installation may be gained from the fact that nearly 3½ miles of cold-rolled 80-20 nickel-chromium strip have been used to construct the elements for the two units. The strip, Nichrome V, was supplied by British Driver-Harris Ltd., and varies from ½ in. wide by 0·4 in. thick to 2 in. wide by 0·055 in. thick. To support the elements, 7,600 hooks also made of Nichrome strip, were used. Each furnace is fitted with six centrifugal fans, each of which is driven by a 17½ h.p. squirrel-cage motor running at 1,440 r.p.m.

Interior of a furnace showing the nickel-chrome elements and one of the six centrifugal fans

Other motors are used for the ingot-handling machinery, four 2 h.p. motors for raising and lowering the furnace doors, and two 5 h.p. motors operate the charge and discharge traversing cars.

Comprehensive protection is afforded by the installation of 75 limit switches, of Donovan and Brookhirst manufacture, which govern all mechanical movements of the doors, pusher-mechanisms, discharge and charge traversing cars, shoe return conveyor and other subsidiary mechanical devices.

Electrical Equipment

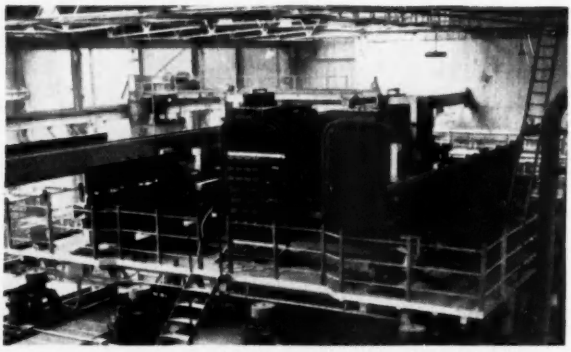
Each unit has an electrical rating of 3,750 kW, and power is supplied to the furnaces through an 11 kV substation mounted on a platform above the furnaces themselves. In order to ensure maximum efficiency, each furnace is split into six independently controlled heating zones, and each heating zone has a main and auxiliary loading. The main loading of all the zones is 560 kW, but the auxiliary loadings vary, being 55 kW for the centre zones and 85 kW for the two end zones. This enables the end losses to be made up. When the ingots have reached soaking temperature, the main loading is cut out and the furnace runs at about 390 kW on the subsidiary loading.

Temperature control is carried out by a Kent "Multelec" Mk. II automatic indicating controller, calibrated over 0·750° C, connected to each heating zone. To give a positive check

and permanent record of thermal conditions throughout the furnace, a six-point continuous chart recorder is incorporated in the automatic temperature control panel. All the thermocouples used are of the chrome-Alymel type.

To protect the furnace against accidental overheating, MacLaren variable-type thermostats are fitted in each zone and cut off the current should a pre-set temperature be reached.

Connecting cable between the heating zones is of Pyrotenax, and the l.t. busbars in the substation are of 6 in. by ½ in. aluminium.



This view shows the two 11 kV transformers, the switchgear and some of the fan motors mounted on top of one of the furnaces

Centralised control, over the whole installation, can be exercised by one man in the control cabin. By a comprehensive system of pigmy lights, the amount of material in the furnace, and the positions of all the handling mechanisms can be shown. The capacity of the furnaces is such that nearly 100 tons of heated aluminium ingots can be delivered every two hours.

Our thanks are due to G.W.B. Electric Furnaces Ltd., and to the Northern Aluminium Co., Ltd., for the information given above.

ELECTRICAL MATERIALS INDEX

Board of Trade Make Certain Changes

SOME amendments to the Price Index for Electrical Materials published in our September 21, 1950, issue have just been announced by the Board of Trade. As we pointed out at that time, the new index represents the movement in prices of the materials used in the electrical machinery industry. The amendments are, in themselves, minor ones, the principal being a series representing iron castings instead of foundry pig iron, by which they were hitherto represented, and the monthly price index numbers have also been corrected. Although the whole weight, 13·5% of the total index, formerly given to foundry pig iron is now taken by the iron castings item, to clarify the position the amended list of materials and weight values is given alongside.

The figures given in the accompanying tables cover the electrical machinery industry as defined in the Standard Industrial Classification, and the weights used are based on information obtained from the 1948 Census of Production. June 30, 1948, is the date adopted for the base of the index. A rise of 3·2% took place in the index between October and November. This was due mainly to increased prices of non-ferrous metals; the greatest movement was shown by brass ingots, while copper, aluminium, lead and tin also rose.

It is stated that, with the possible exception of the November figure, no further amendments will be made to the past index numbers given in the table below.

Principal Materials and Weight Values

Iron castings	13.5
Electrical sheet	13.7
Steel ingots (non-alloy)	7.8
Alloy steel bars	7.6
Brass ingots 60/40	6.5
Heavy steel plates	4.7
Electro-ceramics	4.1
Aluminium ingots	3.8
Copper H.C. electro	3.6
Mica board	3.2
Copper, cold rolled strip	3.0
Copper sheet	3.0
20 other materials	25.5

Table I.—Price Index Numbers of Materials of the Electrical Machinery Industry (June 30, 1949 = 100)

	Jan.	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Yearly av*
1945	74.6	74.9	73.5	73.6	73.8	74.5	74.8	75.2	75.2	75.3	75.3	75.8	74.7
1948	101.9	102.3	102.3	102.3	102.3	101.2	101.2	100.4	100.1	102.6	103.2	103.4	101.9
1949	103.8	103.3	102.4	105.6	103.8	101.2	98.9	99.5	102.7	108.9	110.3	109.6	104.2
1950	109.9	110.1	109.8	111.5	115.9	120.4	122.4	124.3	129.0	131.5	135.7		

Problems and Practice

IN ENGINEERING

Live Wires

I RECEIVED a call from a person who complained that he had received a shock from some telephone wires. Upon arrival at the house I was shown the supposed "live wires" which were lead-covered conductors running along a skirting board. After some questioning the occupant informed me that he had received the shock whilst moving an electric radiator. A voltmeter showed that a potential of 240 V existed between the fire and lead-cased conductors, and a closer inspection of the fire indicated the nature of the fault. The lower element was in contact with the metal-work, probably due to having been pulled out of the groove by careless handling. A 3-pin plug socket was provided for the fire and an earthing conductor was run to the socket, the person, however, who had connected the fire up had decided that two cores were sufficient and the earth core was cut off and left. It was quite a simple matter to put right, but quite another thing to assure the householder that the telephone wires had not been faulty.—*C. P.*

Commutator Inspection

AN idea which I had many years ago, while in the Army, concerned small commutators. In taking the micas down on such assemblies, it is very difficult to see where you are cutting. I found that a magnifying glass fixed to a retort stand does very well, and it can be adjusted to any position to suit the sight of the user. I have found this arrangement beneficial on many occasions, and would not be without it.—*G. A. Leighton.*

Tree Interrupts Washing

THE following account of a rather unusual fault at a local laundry may be of interest to readers.

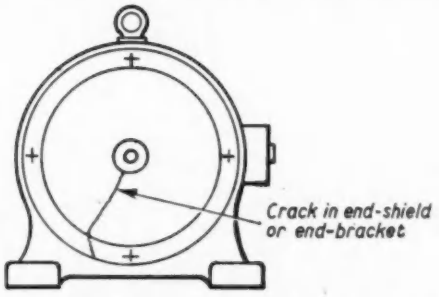
As a result of a message to the effect that none of the motors would start, an electrician was sent to investigate. He reported back by telephone some half hour later that all fuses were intact, and that there was supply on all three phases at the line terminals of each starter, but when the starters were closed none of the motors showed any sign of life.

When I arrived on the job he repeated his tests, connecting a test lamp between each phase and earth, and getting full light on the lamp each time. However, when I connected two lamps in series, across two phases, there was no light, and the result was the same whichever two phases were checked.

Subsequent investigation showed that a tree had fallen across the overhead l.t. network about a mile away, shorting all three phase lines together, but apparently only blowing two fuses; hence, although all three phase lines were alive to earth there was no voltage between them.—*J. D. South.*

Welding Repairs

DURING the installation of a 30 h.p. 3-phase motor in a cotton spinning mill, the motor was accidentally dropped about a foot on to a concrete floor, due to the breakage of a chain sling. This accident resulted in the fracture of two of the motor feet, and one of the end brackets. The crack in the end bracket extended from the bearing housing to the outer



Sketch showing location of crack in end-shield

rim of the casting. The installation of the motor was something of a "rush job," and it was decided that the motor feet, and also the crack in the end bracket, should be repaired by welding.

After the welding repairs had been completed, the motor was hoisted into position on a wall bracket and connected up. The motor was quite free to turn by hand, and the motor pulley was fitted and the rope drive added. However, when the motor was switched on, it failed to turn. The driving ropes were taken off the pulley, and still the motor failed to run when switched on. While the pulley could be turned easily by hand when no current was

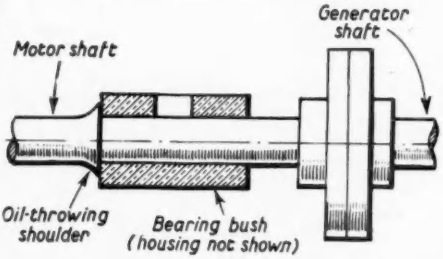
switched on, it was firmly locked in position when switched on to the supply. Apparently the welding of the fracture in the end bracket had caused distortion, making the air gap so unequal that the rotor was pulled to one side of the stator when switched on. Only a new end-bracket supplied by the makers was able to put matters right, which caused much delay and inconvenience. Apparently welding of a fracture in an end-bracket of an induction motor is not a success.—*F. P.*

Lift Trouble

CALLED recently to a lift complaint that the lift used to set off with gates open and no attendant at the controller switch and thinking this most improbable but not impossible, I made a thorough check up. The trouble was that the spring in controller switch was broken (the spring is used only for returning handle to off position), and when lift was either at the top or bottom the broken ends of the springs occasionally shorted between earth and the control terminals. These being on the return side of the operating contactor coils caused the contactor in the lift house to close and so to cut out the gate switches, etc. The easiest cure on the spot was to change the polarity on the contactor coils, so if the spring breaks again and "earths" on to the controller terminals these, now on the "live" side, will blow the fuses.—*Horace Fox.*

Overheated Bearing

IT was recently found necessary to dismantle a motor which drove, through a rigid steel coupling, a generator on the same bed plate. During the period in which the motor was dismantled, the motor half-coupling was removed, and on completion of a repair to the rotor and rings (which had necessitated the dismantling in the first place), the motor was reassembled and the half-coupling refitted on the motor shaft. The motor had oil-ring bearings and the generator had bearings of the ball and roller type.



Arrangement of bearing coupling and oil-thrower showing contact faces

After the motor-generator set had been running for a short time after being put back into service, it was found that the driving end bearing was running hot. Investigation showed that the oil-throwing shoulder on the shaft was bearing hard on the bearing bush. The cause of this was found to be the incorrect fitting of the motor half-coupling, which had been driven past its original position on the shaft, and had resulted in the rotor of the motor being drawn out of correct position towards the generator, and forcing the shoulder against the bush.

The positioning of a motor shaft fitted with oil-ring bearings, and coupled to another machine, should be checked when first, or subsequently as above, mechanically coupled to the driven machine, to check the clearance between each oil-throwing shoulder or ring and the bearing bush.—*S. T.*

Neglected Fuse Boxes

WHILE installing an additional socket outlet in a domestic residence recently, I noticed that the light by which I was working dimmed violently at irregular intervals and music from the radio in an adjacent room was obliterated by loud interference.

On enquiring of the residents as to the cause, they said they did not know but that it had been going on for a year or two. Yes, it was a little annoying, did I think I could do anything about it.

The root of the trouble was soon located. An old-type wooden fuse box controlled the lighting circuits and was situated in the kitchen; the hinges (brass) had long since corroded away, the lid had fallen off, leaving the works exposed to the same corrosive kitchen fumes that had attacked the hinges.

After much work of cleaning up and coating the contacts with P.J., replacing odd bits of assorted wire with 5 amp fuse wire, and replacing the old hinges, the lid was given a coat of shellac and replaced.

Perhaps some of your readers in the contracting industry could explain why fuse board, etc., are invariably placed in damp, inaccessible situations, for example, cellars, kitchens, etc.? And, why do domestic consumers completely ignore electrical apparatus *even* when it has an obvious defect?—*J. K. Maynard.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Troubles—and Remedies

A series of trouble-shooting tables specially compiled to assist maintenance engineers in rapid fault diagnosis

No. 4. SYNCHRONOUS MOTORS

By S. SPENCE, B.Sc.

The synchronous motor comprises two machines, the motor itself and the exciter and although when functioning normally each part of the machine behaves according to its individual characteristics, a fault in one part may give rise to misleading symptoms of trouble in the other part, thereby rendering correct diagnosis difficult. A good example in the writer's experience was the case of an exciter armature being removed several times in an endeavour to locate suspected faulty commutator joints, presumed to be responsible for sparking at the brushes. The trouble was subsequently traced to a faulty joint in the rotor winding of the motor which, being in series with the exciter armature, of course had the same effect on the exciter performance as a break in the armature circuit. This example serves to illustrate that careful reasoning followed by systematic elimination of possible causes of operational symptoms is the surest and shortest way to correct diagnosis and remedy of troubles.

SYMPTOM	CAUSE	REMEDY
General overheating of frame.	Overloading which may be due to:— (*a*) Increase of applied load. (*b*) Wear or defect in the drive or driven machine. (*c*) Partial seizure of or stiff bearing.	(*a*) Reduce load or install larger motor. (*b*) Overhaul or repair as found necessary. (*c*) Overhaul or renew bearing.
	High ambient temperature.	Reduce by improving ventilation. Alternatively change location of motor.
	Adjacent source of heat.	Modify drive to enable motor to be removed from the path of the transmitted heat. Alternatively interpose a suitable protective barrier between the motor and the source of heat.
	Restricted internal ventilation of motor due to obstructing dust deposits.	Dismantle motor for thorough cleaning of internal ventilating ducts, etc. Adopt any practicable measures to prevent or reduce ingress of dust, etc., to interior of motor. It may be advisable to install a totally enclosed or pipe ventilated motor.
	Over-excitation, which may have been effected for the purpose of increasing the overload capacity of the motor, and resulting in a low leading power factor.	Reduce the excitation until the stator current reaches a value where further reduction causes the stator current to increase again. This reduction of excitation will increase the power factor of the motor but reduce that of the system.
Overheating of part of frame only.	High resistance earth fault in winding, due to failure of insulation, resulting in overheating of a portion of the winding only.	Dismantle motor and repair defective portion of the winding.
	Short circuit between turns or coils of the winding, resulting in overheating of a portion of the winding only. *Note:* A further cause, fouling of the rotor, is unlikely to occur with synchronous motors owing to the comparatively large air gaps.	Dismantle motor and repair defective portion of the winding.
Hot bearing (ring oiled).	Insufficient oil in well.	Top up oil level.
	Leakage of oil from well past drain plug or gauge glass.	Refit drain plug or gauge glass correctly.
	Oil well overflow pipe bent or displaced, thereby reducing oil level in well.	Refit pipe in correct position.
	Obstruction in overflow pipe.	Flush out and refill with oil.

SYMPTOM	CAUSE	REMEDY
Hot Bearing (contd)	Oil ring stationary or sluggish in action due to:—	
	(*a*) Ring tight in slot.	(*a*) Reduce width of ring and polish sides smooth.
	(*b*) Ring damaged.	(*b*) Repair or renew ring.
	(*c*) Foreign matter in oil.	(*c*) Clean oil.
	(*d*) Wrong grade of oil.	(*d*) Replace by suitable grade.
	(*e*) Bearing turned in housing due to set screw becoming loose or defective, thereby displacing oil ring slot from normal position.	(*e*) Re-secure bearing in correct position.
	(*f*) Oil ring jumped out of slot.	(*f*) Fit retaining strip across top of slot.
	Bearing metal dust or other obstructions in bearing oil grooves.	Remove bearing for cleaning of grooves.
	Bearing oil grooves incorrectly cut.	Remove bearing and modify grooves, making sure they are correctly located, cut and backed off. The inside of the ring slots should also be backed off.
	Tight bearing.	Scrape bearing to correct fit.
	End thrust on bearing due to:—	
	(*a*) Incorrect assembly.	(*a*) Reassemble motor with rotor in magnetic centre.
	(*b*) Faulty drive.	(*b*) Modify drive as necessary to eliminate end thrust.
	Shaft out of true.	True shaft in lathe and renew bearings.
Hot bearing (ball and roller).	Diametric clearance too small.	Fit new bearing having larger clearance. See note 1.
	Incorrect fit:—	
	(*a*) Inner race too tight on shaft.	(*a*) Polish shaft and re-fit bearing, making race a tight press fit (an interference fit) to prevent "creep."
	(*b*) Outer race tight in end-bracket.	(*b*) Polish end bracket housing as necessary to make bearing race a sliding fit on its seating.
	Too much grease.	Remove excess grease.
	Wrong grade of grease.	Replace by suitable grade with lower melting point.
Hot bearing (all types).	Imperfect alignment of coupling or gear drive.	Re-align correctly.
	Driving belt too tight.	Reduce belt tension.
	Driving belt too far from bearing (due to excessive overhang of pulley).	Modify belt drive accordingly and if necessary fit an extra bearing to share belt load.
	Heat transferred from rotor or stator.	See causes of general overheating of frame.
	Adjacent source of heat.	
	High ambient temperature.	
Middle or outer bearings of three bearing motors overheating.	Hot bearing taking more than its normal share of the load due to:—	
	(*a*) Uneven wear of bearings.	(*a*) Renew excessively worn bearings.
	(*b*) Imperfect alignment.	(*b*) Correct alignment.
Noisy or rough bearing (ball and roller).	Excessive wear.	Fit new bearing.
	Defective (flatted or chipped) ball or roller.	
	Fractured cage or race.	
	Movement of bearing race:—	
	(*a*) Inner race loose on shaft.	(*a*) Build up shaft (by metal spraying process) and machine to correct diameter. Fit new bearing.
	(*b*) Outer race loose in end bracket.	(*b*) Bore out and bush end bracket to correct diameter, or build up and machine, or fit new end bracket. Fit new bearing.
Vibration of motor.	Inadequate foundation.	Remake or strengthen foundation.
	Insecure mounting.	Secure mounting bolts, etc.

SYMPTOM	CAUSE	REMEDY
Vibration (contd)	Rotor out of balance.	Correct balance.
	Pulley, coupling or pinion out of balance.	
	Short circuits in winding.	Check current balance in phase windings, trace and repair defective coils.
	Out of alignment.	Correct alignment.
Motor fails to start or is unable to run up to speed.	Open circuit in the stator winding or external circuit due to a broken lead or joint, defective contact or terminal connection, etc.	Locate and repair the open circuit.
	Damper winding defective due to a broken bar or joint.	Repair the damaged portion of the winding.
	Starting voltage too low to produce the necessary torque. A drop of about 15% in the supply voltage is sufficient to prevent starting.	If the supply voltage is permanently decreased, a higher voltage tapping must be connected on the starting transformer. If this is not practicable, either the transformer must be altered or the starting conditions improved. Since the bearing friction decreases immediately after starting, turning the rotor round by hand before switching in the machine might reduce the friction sufficiently to enable a lightly loaded motor to attain speed. In the case of a small motor switched on the full supply voltage through choke coils, the reactance of the latter should be reduced either by increasing the air gap or reducing the number of coil turns.
	Insufficient torque due to:— (*a*) Wrong switching, putting the rotating field winding in circuit with the exciter.	(*a*) As a rule synchronous motors accelerate better when their rotating field winding is either left open or connected in series with a resistance several times greater than that of the winding itself. The switch usually inserted between the rotating field and the exciter should be left open. If the rotating field is connected to the exciter during starting, a special starting resistance is usually added, which is cut out on attaining the rated speed.
	(*b*) Short-circuited turns in the field coils.	(*b*) Locate and repair the defective portion of the winding.
	(*c*) The mechanical load being too great.	(*c*) (i) Raise the line voltage, or (ii) Reduce the starting load.
Motor fails to synchronise.	Load torque too great due to trouble on the driven machine, resulting in too large an increase in the torque during acceleration.	Locate and remedy the defect or the abnormal condition causing the trouble, e.g. in the case of a pump load, insufficiently closed valves may cause excessive increase in the torque during acceleration.
	Starting voltage too low.	An unloaded motor can always be brought into step by applying the proper excitation, but in the case of machines loaded at the start (which with applied excitation must pull into step from a definite slip), too low a voltage causes an excessive slip whilst the motor is running asynchronously and prevents it being synchronised. Under these circumstances a higher transformer voltage tapping must be used.
	Excessive resistance of damper winding due to defective contacts or broken bars, with consequent excessive slip.	Locate and repair defective joints or bars.
	Open circuit in either motor field, exciter, exciter field, rheostat, or interconnecting leads.	Locate and repair broken conductor, lead, etc., or defective contact, joint or terminal connection.
	Faulty brushes on exciter.	Overhaul brushgear, including checking and remedying any faulty alignment or inadequate spring tension.

SYMPTOM	CAUSE	REMEDY
	Reversed polarity, indicated when, after the excitation is switched on, the stator current does not drop to its minimum value at unity power factor. The stator current may increase with the excitation to a maximum value and then decrease to a minimum at the proper excitation. If this takes place at full supply voltage the stator current may exceed the full load current.	Repeat the starting operation until machine pulls into step with correct polarity.
	Current surges when the full supply voltage is switched on the excited motor.	To reduce to a minimum the current surges caused by switching from starting voltage to full supply a suitable value of excitation of the motor in the starting position should be found and is in the region of the no load excitation at normal voltage and unity power factor, which gives over-excitation at starting. The switch over from "start" to "run" should be effected without delay to ensure that the motor remains in near synchronism with the supply.
Motor "hunting," i.e. issuing a humming sound alternately increasing and decreasing.	Unstable speed of the prime mover driving the alternator supplying the motor.	Improvement of speed regulation of prime mover (this is a matter for the supply engineer).
	Rapid changes in load or load impulses.	Such changes should be avoided where possible, e.g. when the motor is driving a generator, short circuits on the latter should be cleared immediately. When considerable load impulses are likely to occur it is advisable to maintain the motor in an over-excited condition. In this connection, however, it should be appreciated that over-excitation is limited by heating considerations.
	Extensive and simultaneous variations of voltage and frequency due to:— (*a*) Short circuit in the supply. (*b*) Wrong excitation. (*c*) Mechanical overloading.	(*a*) Usually unavoidable. (*b*) Correct the excitation. (*c*) Remove the cause of overloading. Synchronous induction motors with cylindrical rotors on constant excitation will not stand such severe overloading as the salient pole type. They have the advantage, however, that after falling out of step they will continue to run and after the load has decreased will pull into step again.
	Reverse excitation of motor operating on no load for power factor improvement.	Salient pole type synchronous motors will stand reverse excitation and may not pull out until the "reverse" excitation is about 20% of the value for unity power factor. Excessive reduction of excitation should therefore be avoided as wrong phase adjustment may result.
Motor circuit breaker trips during normal operation of plant.	Surge on line. Low voltage due to reduction or fault in supply.	Usually unavoidable and motor can be re-started after the line or supply fault has been cleared.
	Excitation ceases due to:— (*a*) Open circuit in the motor field, rheostat or wiring between the exciter and the motor field. (This is indicated by the exciter voltmeter reading.) (*b*) Exciter not operating. (This is indicated by the voltmeter not reading.)	(*a*) Locate and repair the fault. (*b*) Check the exciter brushes, field coils, armature and rheostat as necessary to trace and repair the fault.

NOTE 1. A small amount of diametric or running clearance is desirable for accommodating the minute inaccuracies which are unavoidable even with the most modern methods of machining. It must also be provided in the bearing to allow for any expansion of the inner race or contraction of the outer race which may be caused by interference fits or variation of temperature.

Ball and roller bearings are made with three different ranges of diametric clearance usually known as "O," "OO" and "OOO," these identification marks being stamped on the races. The standard ranges for electric motor bearings are "OO" for Ball races and "OOO" for Roller races.

NEW YEAR'S HONOURS

ONCE again, many representatives of the electricity supply and manufacturing industries figure in the New Year's Honours List, which was announced this week. At the top of the list, the honour of Knight Bachelor has been conferred upon **Mr. E. D. A. Herbert,** O.B.E., M.I.Mech.E., M.I.E.E., chairman of Short Bros. and Harland Ltd., **Mr. A. M. McTaggart,** director of Balfour Beatty and Co. Ltd.; and **Mr. William Wallace,** C.B.E., M.I.Mech.E., M.I.N.A., chairman and managing director, Brown Brothers & Co., Ltd.

C.B.E.

Those to whom the C.B.E. has been awarded include **Mr. D. W. Barrett,** director and general manager, Smith English Clocks, Ltd.; **Mr. Karl Baumann,** M.I.Mech.E., who has been largely identified with the development of present-day steam power station plant (he was director and chief mechanical engineer to the Metropolitan-Vickers Electrical Co. until his retirement a year ago); **Mr. G. C. Beadle,** controller, West Region, B.B.C.; **Mr. H. Constant,** M.I.Mech.E., F.R.Ae.S., F.R.S., director, National Gas Turbine Establishment, Ministry of Supply; **Mr. J. N. Waite,** M.I.E.E., F.Inst.P., controller, London Division of the British Electricity Authority; and **Dr. Oscar Faber,** O.B.E., D.C.L., D.Sc., M.Inst.C.E., senior partner of Oscar Faber and Partners, who is well known in the industry, particularly in connection with the rebuilding of the House of Commons.

O.B.E.

In the list of recipients of the O.B.E. are **Mr. R. Clarke,** M.I.Inst.E., marine director, Laurence Scott and Electromotors Ltd.; **Mr. H. L. de Bourchier,** M.B.E., principal, Ministry of Fuel and Power; **Mr. W. L. Day,** engineer I, Atomic Energy Establishment, Ministry of Supply; and **Mr. F. Shakeshaft,** A.M.I.E.E., generation design engineer, to the British Electricity Authority. Overseas, **Mr. R. G. Kilburne,** chief electrical engineer to the Government of Nepal, has also been awarded the O.B.E.

Mr. F. Shakeshaft—O.B.E.

Mr. K. Baumann—C.B.E.

Mr. J. N. Waite—C.B.E.

Mr. L. Rushforth—M.B.E.

M.B.E.

The lengthy list of awards of the M.B.E. includes the names of **Mr. A. S. M. Borner,** managing director, Clifford and Snell Ltd.; **Mr. W. J. Cooper,** M.I.E.E., liaison officer, South West Scotland Electricity Board; **Mr. J. A. Dickson,** manager of the Gramophone Co. Ltd. Springfield Road works (Ministry of Supply Agency Factory), Hayes, Middlesex; **Mr. E. G. S. Gregory,** assistant engineer, London Telecommunications Region; **Mr. Robert Lee,** M.I.E.E., A.M.I.Mech.E., sub-area liaison officer, London Electricity Board; **Mr. D. J. Mackie,** manager, Cable and Wireless Ltd., Hong Kong; **Mr. S. D. Pendry,** A.M.I.E.E., engineer, telephone manager's office, Guildford; **Mr. L. Rushforth,** M.I.E.E., head of section, Research Laboratory of the British Thomson-Houston Co. Ltd., Rugby (he was a member of the team responsible for the development of magnetrons and other electronic devices in radar); **Mr. C. W. Skinner,** assistant superintendent engineer, transmitters, B.B.C.; **Mr. W. J. Sparey,** manager of the Electrical Department of Silley, Cox and Co. Ltd.; and **Mr. J. M. Walshe,** A.M.I.E.E., works engineer, Bellis and Morcom Ltd.

B.E.M.

Awards of the British Empire Medal have been made to: **Mr. A. F. T. Brider,** boiler house foreman, Newport, South Wales Division, B.E.A.; **Mr. F. B. Clegg,** chargehand, Whipp and Bourne Ltd.; **Mr. G. H. Cowley,** conveyor attendant, Perival Lane power station, Runcorn, Merseyside and N. Wales Division, B.E.A.; **Mr. E. Graves,** chargehand, Standard Telephones and Cables Ltd., Ilminster; **Mr. J. T. Hathaway,** rolling mill foreman, Henry Wiggin and Co.; **Mr. H. A. Hunstone,** chargehand electrician, Ocker Hill generating station, Midlands Division, B.E.A.; **Mr. F. N. Hunter,** boiler house fitter, Wallasey power station, Merseyside and N. Wales Division; **Mr. J. B. Inglis,** foreman linesman, South Western Division; **Mr. E. G. Long,** foreman, Aeronautical and General Instruments Ltd.; **Mr. H. Strickland,** foreman electrician, Wm. Jessop and Sons Ltd.; **Mr. W. A. Wilkinson,** electrician, North Eastern Electricity Board, Newcastle-on-Tyne; and **Mr. J. Williams,** Class 1 jointer, South Eastern Electricity Board, Rochester.

overseas news

Faroes' Plans

A delegation from the Faroe Islands—a Danish dependency in the Atlantic—has been in Copenhagen discussing with Government officials the erection of a large hydro-electric plant in the islands. It is understood that the delegation asked the Danish State to act as guarantor for the 16 million crowns which will have to be raised, mainly in loans, for the work.

Plant for S. Australia

An additional 30,000 kW turbo-generator for Port Augusta power station was ordered in England recently by Mr. R. H. M. Lea, chief engineer and general manager of the State Electricity Trust of South Australia, it was revealed when Mr. Lea returned to Adelaide last month. While here, he also considered U.K. tenders for two similar sets for the Osborne power station. These tenders the Trust is shortly expected to deal with. The additional 30,000 kW set brings to 90,000 kW the total generating plant capacity now on order for that station. Mr. Lea expects that the first 30,000 kW or 60,000 kW of plant at Port Augusta will begin operating by 1954. By then the generating capacity of the Osborne power station would have been increased from the present 125,000 kW to 200,000 kW. At Port Augusta the latest type of British low oil volume switchgear would be used.

Approved Appliances

As from April 1 next, anyone selling unapproved electric cooking stoves and grillers in Queensland will be liable to prosecution. These appliances must henceforth be approved by the State Electricity Commission. The new Order includes boiling plates, grill boilers, and similar types of hot plates, such as the heating portions of coffee percolators with detachable containers and waffle irons. Mr. N. Smith, the State Electricity Commissioner, has said that the electrical trade had been most co-operative in having appliances tested, and the gazettal of the two new items had not been caused by any sale of dangerous goods. Joint action was being taken by all States to have unanimity on standards in electrical appliances.

Wiring Not Undertaken

The Hydro-Electric Commission of Tasmania has decided not to undertake installation work in private premises because of its many other activities. This answer was recently given by the State Premier, Mr. Cosgrove, when commenting on a suggestion that the work of installing cookers and other appliances might be carried out by the Commission's employees. He said they were already fully occupied by extensions of the power system, for which insufficient labour was available. It was also doubtful whether the Commission could carry out installation work on more favourable terms than licensed electrical contractors. At present, electrical contractors and wiremen had much more work than could be dealt with in ordinary working hours by available staffs, and in an endeavour to meet the position a great deal of overtime was being worked, which had the effect of increasing the average hourly rate which had to be paid to wiremen.

It had been pointed out that in country districts some electricians charged £16 10s. to install a cooker.

Lamp Production

To meet Australia's requirements of car bulbs and other low voltage lamps, a new manufacturing plant has been set up at Abbotsford, in Victoria. The company, known as Lugon Electric Lamps Pty. Ltd., is composed of a group of Melbourne businessmen. The works are under the charge of Mr. H. H. Ryder, A.M.I.E.E., who has the assistance of technicians from England.

Victoria's Transport

Losses on the Geelong, Ballarat and Bendigo trams were partially responsible for an increase in electricity charges to consumers, according to the annual report of the State Electricity Commission of Victoria. The Commission, which operates the provincial tramways systems, indicates that it had lost £250,000 in the last two years on the three systems, which had reached their economic limit. The State-wide tariff increase from July 1 would have been 20% lower, but for this increasingly serious loss on the trams. The Commission has asked the Government to adopt the report on provincial transport by Mr. H. H. Bell, Jnr., who recommended a diesel bus network for Geelong, and trolley bus systems for Bendigo and Ballarat—all to be operated by a new transport authority.

Large Boiler

Claimed to be one of Europe's largest, a new steam boiler, with an evaporative capacity of 660 klb/hr, was put into operation at the Vasteras power station, Central Sweden, last month, bringing the station's operative capacity up to 165 MW. Built into a 55-metre-high tower, the boiler is equipped with automatic extinguishing apparatus and a smoke filter device. When operating at maximum steam pressure, the hearth temperature is 1,300° C.

Co-ordinating Power

The Council of the Organisation for European Economic Co-operation has recommended the setting up of special "unions" for the co-ordination of the generation and distribution of electricity between neighbouring countries of Western Europe. The purpose of these unions would be to use, in the common interest, electric power which, for technical or other reasons, is at present not sent from one country to another. It is proposed that each of the unions would be managed by a Board in which representatives of the electricity industry and one Government delegate would participate.

Power In Athens

There is disagreement between the State and the Athens-Piraeus Electricity Co. on the question of the supply of electricity to the capital in the next two years. The Company contends that the planned new thermal plant at Aliveri, in Euboea, will not be ready in time to avert a disastrous power shortage in the autumn of 1952, and have applied for a foreign exchange and import permit to purchase a new 30,000 kW generator to help bridge the gap. The request has so far been refused by the Government on the ground that the new thermal plant will be available in time, and that the Company would be forced to use imported fuel (as opposed to Greek lignite) for their new plant. Both these statements are denied by the company. The question has been widely discussed in the Press, and has drawn attention to the continually expanding demand for electric power in the capital area, largely owing to the centralisation of new industries in and near Athens. The whole matter, including the desirability of constructing a power plant at Aliveri, is now being reconsidered by M. Papandreou. The possibility of a drastic power shortage in the capital in 1952 has led the Government to think seriously about decentralisation of industry, it is stated.

New Power House

The Rudrapur diesel-engined power house, Naini Tal, was officially inaugurated a few days ago by Pandit Pant, chief minister of Uttar Pradesh. The power project has cost Rs 540,000 and, besides electrifying several small towns, will provide power for the small cottage industries springing up in the area which is being reclaimed. The Rudrapur power house and transmission lines have been arranged in such a way that when the Sarda power project, near Sarda Barrage, also in jungle area, is ready, the Tarai power installation will get energy from the Sarda power project.

H.E. Scheme

Preliminary work is continuing on the Sarobi hydro-electric scheme, Afghanistan, although no start has yet been made on the dam itself. Engineers from Germany are on the site, and it is understood that efforts are being made by the Siemens concern to obtain the contract for the electrical equipment. No decision has yet been made in the matter, however, it seems.

Power Loan

The Central Waikato Electric Power Board, New Zealand, has decided to re-seek a loan of £80,000 for extension and renewal of its power lines and equipment.

Immigrants

Priority immigrants from the United Kingdom destined for work on New Zealand's hydro-electric projects are to be flown to the Dominion by the N.Z. Government. It is expected that the total number to be transported by air will be approximately 130, consisting mainly of carpenters, with a small number of plumbers and electricians. The decision had been taken in view of the urgent need for tradesmen on hydro-electric works and the necessity for early completion of transit accommodation for immigration purposes, coupled with the existing shortage of sea transport.

N.Z. Power Problem

In an effort to obtain more power from the King's Wharf power station, Auckland, it has been suggested by the Auckland Electric Power Board that coal be transported by road at the rate of 300 tons a day. The suggestion has already been taken up, and Mr. Goosman also gave an assurance that it was the State Hydro-Electric Department's policy to build a steam generating station on a suitable coalfield. A responsible officer of the department was overseas with instructions to investigate this and other questions concerning generating policy, he said. It was planned to have the site of the proposed station, and all plans and designs for it, completed within three years. The Minister had also stated that his department was considering the encouragement of power boards to develop individual power stations in their own district.

Bulawayo Extensions

Following the inauguration last month of the second cooling tower at Bulawayo's new power station, Southern Rhodesia, the city is now looking forward to the operation of the second 15,000 kW turbo-generator—which should be within the next six months. Further plant is on order to bring the capacity of the station up to 60,000 kW in two years' time. For this, two more cooling towers 180 ft. high will be erected, but with water such a problem a scheme, however, is under consideration for using in the cooling towers sewage disposal water after its has been properly treated. This would represent a big saving in the city's water supplies, but Mr. A. R. Sibson, the city electrical engineer, has emphasised that the scheme will have to be thoroughly investigated before any decision can be made.

PERSONALITIES

IN THE INDUSTRY

In succession to the late Sir Frank Gill, K.C.M.G., O.B.E., **Sir Thomas G. Spencer,** M.I.E.E., managing director of Standard Telephones and Cables Ltd., has been elected chairman of that company. With S.T.C. (formerly the Western Electric Co. Ltd.) since 1907, Sir Thomas was called upon to take charge of the company in 1932, and will continue as managing director in addition to holding the office of chairman. He is a director and vice-president of the International Standard Electric Corporation; chairman of Standard Telecommunication Laboratories Ltd., of Kolster-Brandes Ltd., and of the International Marine Radio Co. Ltd.

Sir Thomas G. Spencer

The new deputy station superintendent at Portishead power station, South Western Division, B.E.A., is **Mr. A. G. Amery,** who was previously mechanical maintenance engineer at that station.

Previously with Veritys Ltd., **Mr. G. M. Ackroyd** has joined the Southern District of the London home sales staff of Lancashire Dynamo and Crypto Ltd. Mr. Ackroyd served an apprenticeship at the Bradford Works of the English Electric Co. Ltd. and was then employed for some years by the Marconi Co. Ltd. as a wireless officer in the Merchant Navy. In 1930 he rejoined the English Electric Co. as contracts engineer in their industrial motor sales office and remained there until 1949. Following war service he again joined the E.E. Co., this time as sales engineer on the London office staff, and in 1948 became sales engineer for the South London territory of Hopkinson Electric Co. Ltd. He took over power sales interest south of the Thames for Veritys Ltd. at the end of 1949.

Chairman of the North of Scotland Hydro-Electric Board, **Mr. Tom Johnston** was recently appointed chancellor of Aberdeen University.

Sixty-two years continuous service with William McGeoch and Co. Ltd., Birmingham, is the proud record of **Mr. H. Jinks,** who recently retired, aged 81. To commemorate the occasion, he was the recipient of a presentation made by **Mr. W. Percy McGeoch** on behalf of the directors.

Recently appointed deputy station superintendent, Newton Abbott power station, South Western Division, B.E.A., is **Mr. R. A. Peddie,** B.Sc.(Eng.), A.M.I.E.E., who was formerly efficiency engineer at the Portishead power station.

Mr. E. Fost has been appointed secretary-general of R.A.M.A.C. in succession to **Mr. J. Connell,** who is retiring from the post, which he has held since the formation of the Association. R.A.M.A.C. (Radio Marine Associated Companies) is a world organisation of companies operating marine radio services.

Hoover Ltd. announce that as from January 1, 1951, certain of their directors and executives have assumed new responsibilities. The changes are as follows: **Mr. A. G. Colston** from technical service manager and director, Hoover (Washing Machines) Ltd. to technical sales manager and director, Hoover (Electric Motors) Ltd. Mr. Colston will assume control of the sale of f.h.p. motors in addition to continuing to direct the servicing of all Hoover products. **Mr. C. H. Crowlie** from sales manager, Gt. Britain, and director, Hoover (Electric Motors) Ltd. to export sales manager and director, Hoover (Washing Machines) Ltd. Mr. Crowlie will direct the sales of all Hoover products in all overseas territories. **Mr. S. Roberts,** a director of Hoover (Washing Machines) Ltd. from field sales manager to home sales manager, in which post he will be responsible for all departments of the Hoover Sales-Service Organisation in Gt. Britain and Ireland, except those of technical sales manager. **Mr. G. J. Hemmings** from northern sales manager to field sales manager, Gt. Britain. **Mr. J. B. Rogerson** from assistant technical service manager to technical service manager, and **Mr. H. G. Hulme** from Scottish branch manager and assistant northern divisional manager, with headquarters at Glasgow, to northern sales manager, with headquarters at Leeds. Mr. Hulme's successor has not yet been nominated.

Mr. H. A. Ashmawy, A.M.I.E.E., has been appointed estimator in the Home Sales Department of the London Office of Lancashire Dynamo and Crypto Ltd. Apprenticed at the Witton Works of the General Electric Co., Ltd., he joined the sales staff of that organization in 1943. Subsequently he became technical sales engineer at the Cairo offices of the G.E.C. In 1947 he was appointed chief engineer of the Transport and Engineering Co., Ltd., Cairo, a post which he retained until returning to this country two years later.

The directors of the General Electric Co. Ltd. announce that **Mr. Harold Hobson** has joined the board of the company. Mr. Hobson was with Merz and McLellan and the County of London Electric Supply Co. before joining the Central Electricity Board as commercial manager in 1928. He was subsequently appointed general manager, and finally chairman in 1944 until 1947 when the B.E.A. was set up.

Pirelli-General Cable Works Ltd. have appointed **Mr. B. O. Ashford,** B.Sc., D.I.C., F.R.I.C., F.Inst.Pet., development engineer for their Eastleigh Works. This is a new appointment, and his duties will include co-ordination of all development work within the factory, and liaison with technical and scientific institutions. Mr. Ashford joined the company in 1929 as chief chemist, a position in which he will now be succeeded by **Mr. A. N. Coffin. Mr. R. Newman,** B.Sc., will assist Mr. Ashford in his new duties.

At present district engineer at Loughborough to the East Midlands Electricity Board, **Mr. P. E. Simmonds,** A.M.I.E.E., has been appointed distribution transformer sales engineer with Gresham Transformers, Ltd. He has previously held appointments with the Leicestershire and Warwickshire Electric Power Co., Blackpool Corporation Electricity Dept., and the Yorkshire Electric Power Co. Mr. Simmonds takes up his new duties on February 1.

We hear that **Mr. M. H. Hammill,** B.Sc., A.M.I.Mech.E., director of Foster Transformers and Switchgear, Ltd., has been appointed general manager. **Mr. B. L. Perkins,** B.Sc., A.M.I.E.E., the company's export manager since 1945, has been appointed general sales manager. He will continue to take special responsibility for export business, as will **Mr. P. C. Mortimore,** O.B.E., for homes sales.

Mr. K. A. Zandstra, head of the High Frequency Department of Philips Electrical Ltd., has been awarded the Bessemer Premium by the Society of Engineers for his paper entitled "High Frequency Heating in Industry." The Premium will be presented on the occasion of the presidential address on February 5.

In succession to **Mr. H. J. Nichols,** C.I.E., D.Sc., M.Inst.C.E., A.M.I.Mech.E., who has resigned, **Mr. J. Muil,** A.M.I.E.E., has been appointed registrar and secretary of the Professional Engineers Appointments Bureau.

Mr. J. Jex-Long, who recently retired from the position of works manager of the Hebburn New Town Works of A. Reyrolle and Co., Ltd., has been presented with a wrist watch, fishing tackle and a silver cigarette case from members of the staff.

Engineer of the Liverpool Central district, No. 1 Sub-Area, Merseyside and North Wales Electricity Board, is **Mr. F. W. H. Langston,** A.M.I.E.E., A.M.I.I.A., and not Langton, as we recorded on December 14.

On the occasion of the recent retirement of **Mr. L. B. Dent,** A.M.I.E.E., M.Inst.F., from the position of station superintendent, Islington generating station, London Division, B.E.A., he was the recipient of a presentation made by the divisional controller, **Mr. J. N. Waite,** on behalf of his colleagues. Mr. Dent has served in the industry for over forty years. He started at Watford and later transferred to Uxbridge. In 1915 he took an appointment at Islington, where he remained until retiring.

Previously on the Birmingham staff of Enfield Cables, Ltd., for many years, **Mr. J. J. Timmins** is now manager of the firm's new branch at Hanley, Stoke-on-Trent.

Dewrance & Co., Ltd. announce that **Mr. J. H. Gibson,** A.M.I.Mech.E., chief engineer, has been appointed a director of the company.

The Railway Executive of British Railways has announced that **Mr. H. H. Swift,** B.E., M.I.E.E., previously executive officer (electrical engineering) new works and development), Railway Executive headquarters, has been appointed mechanical and electrical engineer, Southern Region, as from January 1. Educated in South Australia, Mr. Swift subsequently served in the works of Siemens-Schuckert in Berlin, prior to the 1914-18 war. Afterwards he joined the English Electric Co., Ltd., being employed on important electric traction schemes in Japan, South Africa, Denmark and Poland. He joined the L.N.E.R. in 1936 as assistant electrical engineer, when he was chiefly engaged in the scheme for the electrification of the Manchester-Sheffield and Liverpool Street-Shenfield lines. In 1941, when the department of the electrical engineer was separated from that of chief mechanical engineer, Mr. Swift was appointed assistant chief electrical engineer of the L.N.E.R. and, on nationalisation in 1948, was made electrical engineer (acting) Eastern and North-Eastern Regions of British Railways. He became executive officer (electrical engineering, new works and development) at Railway Executive H.Q. in March last.

Mr. H. H. Swift

The board of directors of Electric & Musical Industries Ltd. (E.M.I.), have appointed **Sir Ernest Fisk** governing director of Electronic Tubes Ltd.

We understand that **Mr. B. J. F. Allen** has resigned as a director of Allen and Pope Ltd., and is no longer in any way associated with the company.

At the end of this week, **Mr. J. H. F. Benford,** joint commercial manager to London Transport, retires. **Mr. D. McKenna,** M.A., has been appointed commercial manager and will assume full responsibility for the work of the Commercial Department. He has been acting jointly with **Mr. Benford** since March last.

Mr. T. A. Simpson, who has now been appointed deputy general manager of the Marconi International Marine Communication Co., Ltd., has served continuously with that company since 1913. For the past three years he has been contracts manager (deep sea section).

Two new appointments are announced by Babcock and Wilcox Ltd. **Mr. A. Law,** who for the past 11 years has been manager of the Commonwealth Sales Department, has been appointed deputy sales manager; and **Mr. J. S. Robertson,** who, since 1941, has been manager of the firm's New York office, has been nominated to succeed Mr. Law as manager of the Commonwealth Sales Department in London.

Mr. A. Law

Mr. J. S. Robertson

Mr. J. Dowsett, district executive officer of the Southern Electricity Board at Maidenhead, has recently completed 50 years' service in the Electricity Supply Industry. He was apprenticed at the Windsor generating station in 1900, later became station superintendent.

To call upon overseas agents and supply undertakings, **Col. L. C. Bingham,** general sales manager of Venner Time Switches Ltd., leaves London by air on January 16. His route will be: Karachi, Delhi, Calcutta, Madras, Bombay, Nairobi, Salisbury, Johannesburg, Durban, Port Elizabeth, and Capetown.

Mr. J. E. Cowderoy, M.B.E., development officer to London Transport, retired at the end of last year. He started his transport career in 1902 with the Kidderminster District Electric Lighting and Traction Co., Ltd., and joined the old London General Omnibus Co. in 1913 as schedules assistant. Two years later he became assistant to the operating manager, L.G.O.C. and Underground Railways, and in 1921 traffic investigation officer. On the formation of the London Passenger Transport Board in 1933 he was appointed development officer, a position which he has held to date. For many years Mr. Cowderoy has made an intensive study of the travelling habits of the public. For his work in connection with the staggering campaign Mr. Cowderoy was made M.B.E. in 1944.

As from January 1, **Mr. J. B. G. Northcott,** of Nottingham, East Midlands area representative of the Electric Construction Co., Ltd., took over the representation of the company in Devon and Cornwall, his new address being:—"Lambourne," Penhallow, Truro. His successor as East Midlands area representative is **Mr. G. J. S. Drury,** T.D., M.B.E., M.I.E.E., 22, Harley Road, Sheffield 11.

Mr. F. D. Larcombe, A.M.I.E.E., formerly North of England district engineer for Callender's Cable and Construction Co., Ltd., and later site engineer of McLellan & Partners, has now joined the board of directors of Larcombe Bros., Ltd., consulting engineers, of Liverpool.

OBITUARY

The death occurred on December, 31, of **Sir John Greenly,** K.C.M.G., C.B.E., M.I.Mech.E., F.inst.F., aged 65, who had been chairman of Babcock and Wilcox Ltd. since 1937, a director of Power Securities Corpn. Ltd., and many other companies. He served on numerous industrial committees and other bodies in connection with metals, fuel and power, etc.

The death occurred on December 20 of **Mr. J. N. Archer Houblon,** M.I.E.E., aged 72, who was successively associated with Crompton and Co., Ltd., then as manager and secretary to the Sevenoaks and District Electricity Co., a director of Twiss Electric Transmission Co., and the Bideford and District Electric Supply Co. Ltd.

The death occurred on December 14 of **Mr. C. W. Clarke,** A.C.I.S., aged 81, who was assistant secretary to the former Callender's Cable and Construction Co. Ltd., retiring in 1940 after 45 years' service with the company.

We learn with regret, of the death on December 18 of **Mr. T. G. Russell,** LL.B. (Manchester), former vice-chairman of the British Driver-Harris Co., Ltd., from which position he retired in September, 1948. Mr. Russell, in the capacity of solicitor and legal adviser, was connected with the organisation from its formation. He became secretary in 1931: a director in 1945; managing director in 1946, and vice-chairman in 1947. He had travelled widely in the interests of the concern.

We note the death on December 27 of **Mr. E. C. Zoephel,** founder and managing director of the British Domolac Co., Ltd.

We learn with regret of the death on December 21 of **Mr. G. B. Dent,** A.M.I.E.E., aged 64, who only retired from the position of station engineer at Newton Abbott at the end of September last, after holding that post for 31 years. Prior to joining the Torquay corporation undertaking in 1919 he had served with the Woking Electric Supply Co., the Northampton Electric Light and Power Co., and the Northmet Power Co., after previous experience in the Apsley power station of John Dickinson and Co., and with the Wakefield District Light Railway Co., Ltd. He had studied at Leeds Technical College, gaining practical training with Flather and Co., Ltd.

The death occurred on December 23 of **Mr. E. J. Ivison,** M.I.E.E., aged 82, whose career was spent in the service of the General Post Office, with which he started in 1886, joining the Engineering Department in 1896. He retired over 20 years ago, at which time he held the post of staff engineer, in London.

Progress in Production

Three Manufacturing companies report heavy demand for electrical equipment during 1950

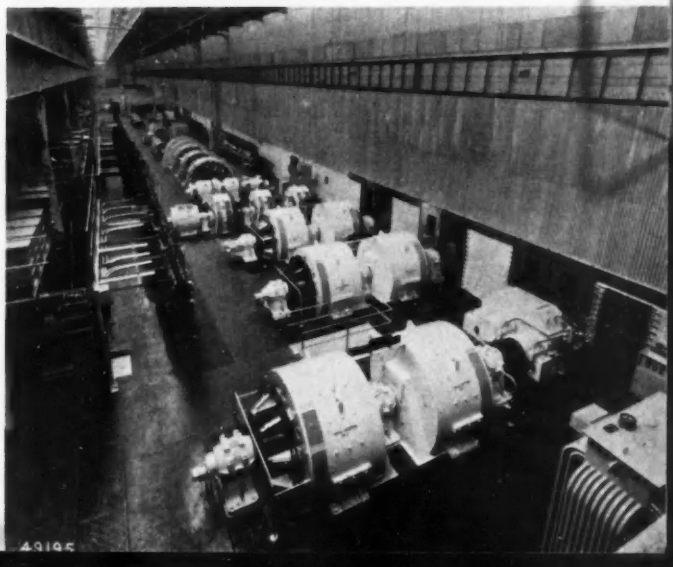
No. 1. British Thomson-Houston Co. Ltd., Hackbridge & Hewittic Electric Co. Ltd. and Richardsons, Westgarth & Co., Ltd.

READING the accounts of the past year's work, which have been received from the principal firms engaged in the manufacture of electrical plant and machinery, one is struck by the continued expansion and development in all branches. While in part this may be accounted for by the continuing demand from the B.E.A. for plant required in connection with the power station programme, much of it is due to continued overseas orders.

In the following we give briefly some of the highlights of the year's work. Space considerations unfortunately preclude our recording in detail the various orders received.

British Thomson-Houston

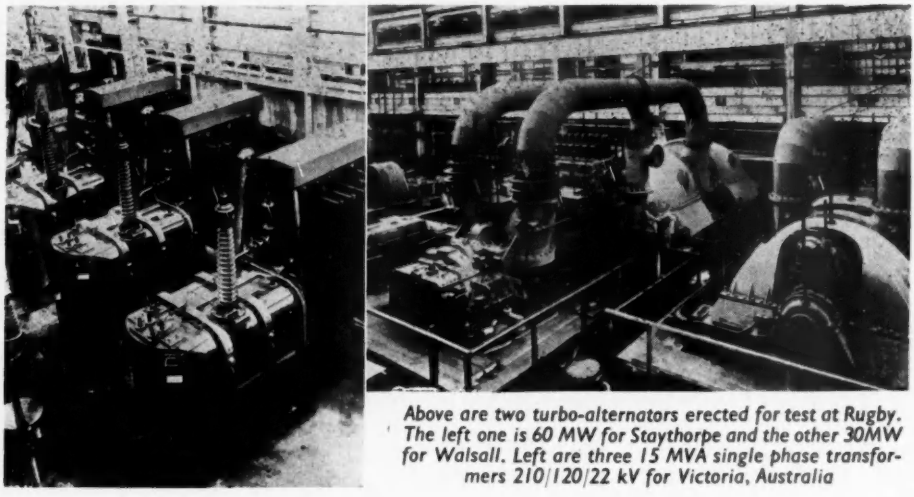
Among the large turbo-alternators built for the home market are the two 60 MW, 3,000 r.p.m., 900 lb./sq. in., 900° F. machines with air-cooled alternators now running at Staythorpe. These are the first of their kind in the country. The second 52 MW set for Nottingham, and two 30 MW sets for Kingston, have also been commissioned this year. A particularly interesting machine is on order for the Ford Motor Co. at Dagenham. This is designed to take over the week-end load from the existing 30 MW sets, and to supplement them during the factory working load. Under the former conditions the set is supplied with steam at 375 lb./sq. in. 840° F. taken from the 1,200 lb./sq. in. boilers through a reducing and desuperheating system, and has a rating of 17,600 kW, while under the latter form of working, the initial steam conditions become 195 lb./sq. in. 550° F. with steam taken from the extraction steam system or the l.p. boilers, and the machine rating then falls to 15 MW. A further interesting feature of the installation is that a live steam heater is used for raising the h.p. feedwater temperature.



This impressive view shows some of the mill motors and motor-generator sets made by B.T.H. for the Northern Aluminium Co.'s Works at Rogerstone

Gas Turbines

Satisfactory progress has been made during the year on the construction of the two 2,500 kW gas-turbo-alternator sets ordered by Balfour Beatty and Co., Ltd., for the East African Power and Lighting Co., Ltd. These are single-cylinder open-cycle machines. Tests have also been carried out on the 1,200 b.h.p. marine gas turbine for the tanker M.V. *Auris*. This is also an open-cycle machine and equipped with a heat exchanger and has two turbines in series, the h.p. turbine driving the compressor while the low-pressure turbine drives the 880 kVA generator which provides power for the propulsion motor. Considerable development work has been done on the general problem of compressors and high efficiencies have been reached.



Above are two turbo-alternators erected for test at Rugby. The left one is 60 MW for Staythorpe and the other 30MW for Walsall. Left are three 15 MVA single phase transformers 210/120/22 kV for Victoria, Australia

The most important order received during the year came from the State Hydro-Electric Department of New Zealand, and covered four waterwheel alternators for Roxburgh Power Station, which is eventually to house eight machines. Each alternator is rated at 44,444 kVA, 10/11·5 kV, 0·9 p.f. at 136·4 r.p.m. The machines will have an overall diameter of 28 ft. and a weight of 330 tons. Another hydro-electric contract covers two 36,000 kVA 600 r.p.m. machines for Artias Power Station in Spain.

During the year, two 35,000 kVA horizontal alternators have been dispatched to Norway, and at Clunie Power Station in Scotland, the first two 22,667 kVA vertical alternators have been commissioned and the third is well advanced on site. Erection has also begun on the first of three 62,400 kVA sets for Fuerzas Electricas del Noraeste S.A. (Spain), and many other machines ranging in size from 3,000 to 62,400 kVA are under construction.

Switchgear and Transformers

The demand both for switchgear and for transformers continues at a high level. Development of the standard 275 kV 2,500 MVA lenticular circuit-breaker has been continued and test certificates are now available for ratings of 7,500 MVA at 275 kV and 5,000 MVA at 220 kV. Orders on a considerable scale have also been received for "Shunt-arc" dead-tank o.c.b.'s and for metalclad switchgear.

On the transformer side, the most notable achievement during the year was the successful completion of the first three 15 MVA single-phase units which form one of the 45 MVA 210/120/22 kV banks for the State Electricity Commission of Victoria, Australia. Other orders include eight 15 MVA 33/11 kV 3-phase units for the L.E.B. and four 10 MVA 33/11·5 kV 3-phase units for the East Midlands Board. Export orders have been received from Johannesburg (five 40 MVA banks of single-phase units), India, Rhodesia, and other areas. Rectifier units for railway applications and for industrial use continue in demand.

Electronics

The attractiveness of the application of electronic control to printing press drives is exemplified by the fact that altogether some 25 newspaper drives, totalling over 5,000 h.p., are now in hand. The first of eight drives for a national newspaper was completed and tested. An unusual electronic application is that to special loading equipment to be used on the Manchester-Sheffield-Wath railway electrification scheme, where fan-cooled loading units are automatically switched in to absorb regenerated power when necessary. Work has continued on h.f. heating and a 25 kW 400 kc/s 25/1,000 kVA oscillator should be in production in 1951.

Industrial Equipment

The number of industrial equipments produced is, of course, legion. An interesting order is one for the machinery and control equipment of the largest walking dragline in the world. Crane equipments are being built for

Stothert and Pitt for Brazil, and for Messrs Wellman Smith Owen. Many units are using the B.T.H. "Stacreep" a.c. control.

Ship propulsion units, mostly electromagnetic clutches and gearboxes, remained in good demand, among them being an order for two couplings each rated at 5,650 b.h.p. at 228 r.p.m., these being the largest in the world. Several sets of auxiliary ship equipment were also supplied.

In the traction field considerable progress has been made in diesel-electric propulsion, and three sizes of locomotive, namely 165 h.p., 230 h.p., and 827 h.p., have been fitted with B.T.H. electrical equipment. Orders are in hand for ten 1,000 h.p. switching locomotives for New South Wales, and eighteen 400 h.p. shunting locos for Western Australia. Production has continued on the latest order for 200 Type PCM equipments for London Transport, and the same type of equipment for 1,500 V working has been included in the multiple-unit trains of the Bombay, Baroda and Central India Railway.

The requirement for rolling mill drives remains heavy. At the Northern Aluminium Co.'s Rogerstone Works a total of 20,000 h.p. of B.T.H. main roll motors has been installed, together with 16,000 kW of motor generator sets. The driving motors for the new continuous rod mill of Guest Keen and Nettlefold were supplied by B.T.H., and the drive for the Steel Company of Wales' 80 in. Hot Strip Finishing Mill has been dispatched and erection is nearing completion.

Many electric winders and hoists have been supplied, both to the N.C.B. and to mines abroad, and numerous orders were booked for motors of various sizes.

Hackbridge and Hewittic

An exceptionally busy year is reported from the Hackbridge and Hewittic Electric Co., Ltd., who have had a steady increase in output throughout 1950.

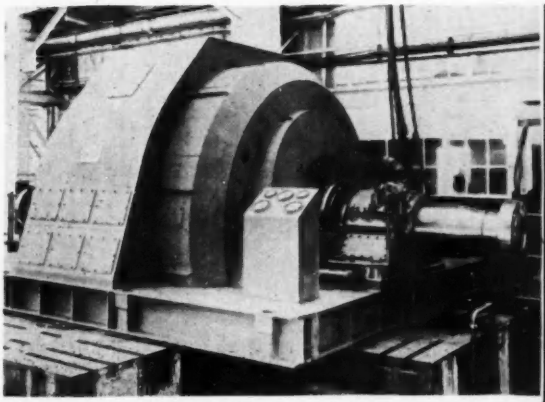
Among the larger transformers dispatched are two of the three 70 MVA 3-phase OFW generator transformers ordered for Skelton Grange. These have cable sealing ends on the 134 kV side, and include on-load tap-changing equipment to give voltage variation of $\pm$ 10% in 14 equal steps.

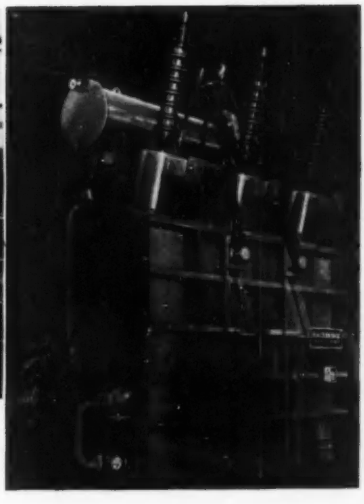
Many other large transformers have been dispatched including two 60 MVA ON/OFB units for Huncoat, the first of two 37·5 MVA units for Ballylumford, three of the four 34 MVA generator transformers for Blackwall Point and a 30 MVA unit for Finchley.

Smaller transformers have been supplied to Spondon, Kirkby substation, the Yorkshire Electricity Board, the East Midlands Board, and to overseas buyers.

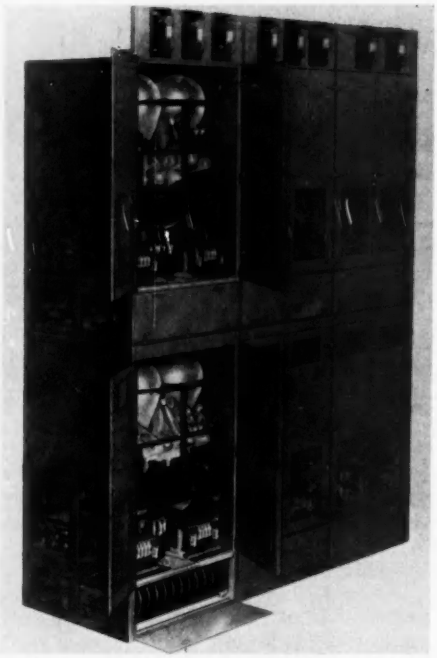
Rectifiers

The year has also been notable for the demand for rectifiers and, in addition to the increasing requirements for Hewittic rectifiers for the operation of heavy d.c.-driven machinery in steel works and other engineering plants, 1950 has witnessed the completion of a large





Above is a BTH 35 MVA, 500 r.p.m. 11 kV horizontal water-wheel alternator for Aabjoera, Norway. Right, is a Hackbridge 20 MVA 3-phase, 100/6·6 kV transformer for Tata Hydro-Electric Power Supply Co., India



Compactness is the keynote of this Hewittic rectifier assembly

overseas contract which involves the installation of up to 26,000 kW of Hewittic rectifiers. Arranged in banks of up to 5,000 kW, these equipments supply a d.c. light and power network.

Traction services both home and overseas have been supplied, Leeds City Transport, for example, have had several units including a 3,000 kW equipment. Three 1,500 kW equipments have been supplied to the British Columbia Electric Railway Co., two 800 kW rectifiers have been shipped to Adelaide, and two 1,000 kW units sent to Spain.

An American requirement has been met by installing a 500 kW grid-controlled rectifier unit. This operates from a 4,160 V 3-phase 60 c/s supply and gives an output of 770 amperes for forming electrolytic condensers. The complete equipment is assembled in a compact block consisting of two cubicles, one being ventilated and containing the rectifier bulbs and the other, totally sealed, containing the air-cooled transformer and other units.

Richardsons, Westgarth

During the year the second of two 31,500 kW turbo-alternators has been started up at Freemen's Meadow Power Station, Leicester, and preliminary test runs obtained on a 60,000 kW unit at Portobello Power Station, Edinburgh. This latter unit operates with a steam pressure of 1,325 lb./sq.in.g., and a temperature of 950° F., and owing to the restricted space available for its installation has been designed as a cross compound unit of the minimum practicable overall length.

Erection is proceeding of the first two of four 32,000 kW turbo-alternator sets at Rye House Power Station near Hoddesdon, and of the surface condensers in connection with the first two of four 52,500 kW turbo-alternator sets to be installed in the new Brighton 'B' station.

Erection of the surface condensers for the first two units for the Bankside Power Station, London, is also proceeding.

The Velotrol system for providing d.c. motors with variable field or armature currents, enabling close control of speed has proved popular and an increasing demand has occurred.

SOLUTION TO CHRISTMAS CROSSWORD

	1C	2O	O	3L	I	4N	G	5T	O	6W	E	7R		8P
9C		P		E		E		R		A		U		R
10I	T	E	R	A	T	E		11I	N	T	E	N	S	E
R		R		S		D		P		E		N		D
12C	H	A	S	T	I	S	E		13F	R	E	E	Z	E
U		T						14F		F		R		S
15I	T	E	M	16S		17S	E	R	I	A	L			T
T		S		T		E		E		L		18T		I
B			19G	R	E	A	S	E		20L	E	A	R	N
R		21H		E		T						N		A
22E	R	E	C	T	S		23S	24T	R	25A	I	G	H	T
A		A		C		26A		R		N		E		I
27K	I	T	C	H	E	N		28A	N	T	O	N	I	O
E		E		E		N		I		I		C		N
R		29D	I	S	C	O	N	N	E	C	T	E	D	

The BUYER'S *Column*

New Simplex Cooker Control

A COOKER control unit available with two different auxiliary circuits has now been marketed by SIMPLEX ELECTRIC CO., LTD., Oldbury, Birmingham.

The two versions of the unit are listed in the Simplex catalogue as Nos. 3802 and 3803. The first version is provided with a 3-pin B.S.S. 546 15 amp. plug interlocked with a slow break switch and protected by a 15 amp. re-wireable fuse, whilst the other is for ring main operation, being fitted with a 3-pin 13 amp. shuttered socket to B.S.S. 1363 non-interlocking and controlled by a 15 amp. slow break switch. Both circuits are independent of the main cooker switches.

The main switch, common to both versions, is a 30 amp. d.p. slow break 250 V a.c. switch provided with clear indication of the "off" and "on" positions.

The cases are clean looking, they are constructed of seamless steel sheet, bonderised and finished in durable cream or grey mottle synthetic stoved enamel. Ample earthing is provided by two special adaptable internal earthing clamps which grip differing sizes of wire simultaneously.

For wiring the cases are provided with two one-inch clearance inlets at top and bottom, and one at the back with easily removable knockouts.

Advances in Prices

COMPELLED to advance by 10% prices of all reflectors and components for double capped tubular lamps and all internal signs as from January 1, 1951, LINEALUX LTD., 142 Liverpool Road, London N.1, announce that these increases do not apply to their "700" series.

THE HOTPOINT ELECTRIC APPLIANCE CO., LTD., Crown House, Aldwych, London W.C.2, however, announce price increases for their home laundry equipment which are effective as from December 20 last year. They are as follows:—

Washing m/c model	CF/P	a.c. £55 plus p. tax £14 6s.
,, ,, ,,	CF/P	d.c. £57 10s. plus p. tax £14 19s.
,, ,, ,,	CF	a.c. £50 plus p. tax £13
,, ,, ,,	CF	d.c. £52 10s. plus p. tax £13 13s.
Rotary Ironer	,, RK	a.c. £21 plus £5 9s. 3d. p. tax
Table Ironer	,, TC	a.c. £21 plus £5 9s. 3d. p. tax
Clothes Dryer	,, ED154	£9 10s. plus £2 9s. 5d. p. tax

THE CARRON CO. LTD., Carron, Falkirk, announce that as from January 1, list prices of their electric fires and boiling rings have been increased by approximately 12½%. Dispatch of new price lists will be expedited.

CONTACTOR SWITCHGEAR LTD., Moorfield Road, Wolverhampton, have notified us that their Price Advance has been increased from 4% to 15% as from January 1, but that orders against valid outstanding tenders will be accepted until January 31, or if for export, April 1, 1951.

THE WARM GLOW CO., LTD., Leigh-on-Sea, Essex, have sent a new leaflet, S.58, which shows revised prices incorporating a price increase effective from January 1. New prices shown are for Model BW (50 W size) £6 12s. and £1 13s. (purchase tax), calico cover £1 5s. for model CW (70 W) £11 4s. plus £2 16s. purchase tax), calico cover £2 8s. and model DW (100 W) £16 10s. plus £4 2s. 6d. (purchase tax), cover £3 15s.

Varionic Drives

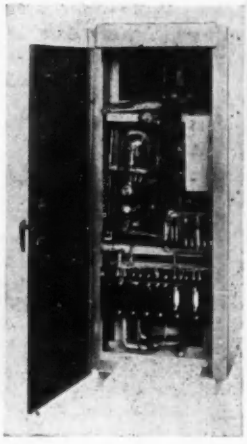
THE use of certain American patents, including the application of sensitive phase-shifting networks for the grid control of mercury arc rectifiers used on variable speed motor drives, has now been arranged by the Lancashire Dynamo and Crypto group of companies.

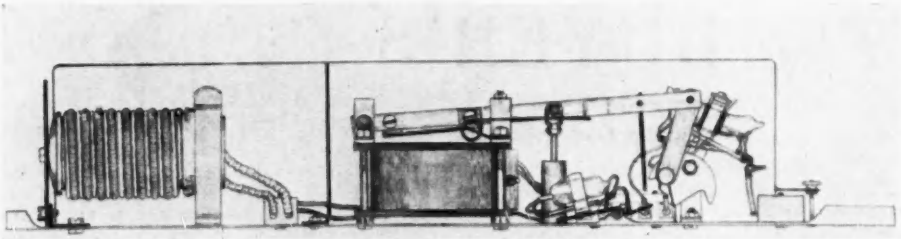
Prototypes of the new standard single-phase Varionic drive have already been built and tested by the NEVELIN ELECTRIC COMPANY LTD., Purley Way, Croydon. This equipment provides an inexpensive variable speed control incorporating feedback circuits for stabilisation of speed, automatic current limitation and provision for automatically controlled dynamic braking when required—up to 6 pre-set speeds are available. The whole unit is designed for maximum simplicity and reliability, and the standard equipment can be switched on load from cold without any preliminary warming up.

The selection of components and materials has been made from items readily available in Great Britain so that no difficulty should arise if a replacement part is required.

The drives are standardised for 200/500 V, single-phase supplies, for horsepower ranging from 1-3.

Below is Creda's stylish cooker control with 13 amp. flat pin socket, whilst right we show a Nevelin Single phase Varionic control cubicle





Above is shown a line diagram showing construction of the "Morvis" d.c. fluorescent control unit

D.C. Fluorescent Lighting

A NEW control unit for d.c. fluorescent lighting has recently been marketed by H. L. V. APPLIANCES, LTD., of Hastings House, Norfolk Street, W.C.2. The "Morvis" as the unit is termed not only gives automatic reversal of polarity which is essential to the successful use of fluorescent tubes on d.c. but enables the standard thermal or glow type starter switch to be dispensed with, the necessary kick for starting being supplied by a mercury switch incorporated in the mechanism. The construction is shown in the reproduced illustration above. When the supply is switched on, the armature of the central magnet is attracted. After being restrained by the dashpot for a sufficient length of time to allow the cathodes due time to warm up, it operates the small mercury switch to start the tube, the necessary inductive kick being provided by the magnet winding itself. At the same time it resets the rocking mechanism of the mercury change-over switch so that reversal of polarity takes place on the next operation.

Since a thermal switch is not required, the unit possesses considerable stability at times of low voltage. Available for either 40 or 80 W tubes in voltage ranges of 200-210, 210-220, 220-230, 230-240 V, the unit is housed complete with resistor in a steel case 16⅜ in. × 2⅝ in. × 3 in.

Alloy Steels in Design

GOOD design, good steel and good preparatory treatment add up to satisfaction in alloy steel components. A loose leaf booklet dealing with all three factors under the title "3 Keys to Satisfaction" has now been sent us by the CLIMAX MOLYBDENUM COMPANY OF EUROPE, LTD., 99 Pinstone Street, Sheffield 1, and we can recommend it to all engineers who have to deal with alloy steels.

The booklet was prepared by American engineers, and so detailed tables refer mainly to U.S. standard steels, but in the design and treatment sections especially, and in the part on steels to some extent, there is much valuable general information concisely and attractively presented. Copies of the booklet are being distributed free.

TRADE PUBLICATIONS

HEATED CLOTHING.—Milliwatt Ltd., 10 Spring Place, London N.W.5, were pioneers of electrically heated flying suits. They supplied several thousands of these suits to the American Air Forces during the war. A brochure issued by the company gives details of this work and of their present-day range of pads and blankets.

CAR RADIO.—The various models made by E. K. Cole Ltd., Ecko Works, Southend-on-Sea, are illustrated in a booklet issued by the company.

LIGHTING FITTINGS.—Decorative commercial and industrial lighting fittings are featured in Rich & Pattison's new catalogue. Their address is Jamaica Row, Birmingham 5.

TRANSFORMERS.—A new brochure from the Lindley Thompson Transformer and Service Co., Ltd., St. Marys Road, Middle Green, Slough, Bucks., lists current production of the company.

CABLES AND DISTRIBUTION EQUIPMENT.—A finger index booklet giving details of the range of equipment produced is available from W. T. Henleys Telegraph Works Co., Ltd., 51/53 Hatton Garden, London, E.C.1.

NICKEL COPPER ALLOYS.—"Monel" metal nuts, bolts, screws, rivets, nails, washers, cotter pins and wood screws are available from stock from Henry Wiggin and Co., Ltd., Wiggin Street, Birmingham, who have surveyed this service in a recent folder.

ELECTRIC MOTORS.—"L.D.C.—The symbol of power in Industry," is the title of a recent brochure by the Lancashire Dynamo and Crypto organisation. It gives the reader an idea of the large range of plant available from L.D.C. and illustrates some typical uses.

TRAFFIC LIGHTS. Another branch of the work of Automatic Telephone and Electric Co., Ltd., Strowger Works, Liverpool, 7, is the production of the "Electro-matic" system of traffic signals. This is described in a recent leaflet.

"RAWLPLUGS."—A comprehensive new catalogue is just issued by the Rawlplug Co., Ltd., Cromwell Road, London, S.W.7, describes all of the fixing devices which are made by the company and gives details of lengths, diameters and prices.

THE WEEK

INDUSTRY *in news* COMMERCE

Peak Period Publicity

SOME readers may have already noticed new advertisements in the daily and weekly Press advocating measures necessary to counteract power cuts. These advertisements are part of a revised B.E.A. campaign, planned to meet the serious situation which has arisen in recent months because of the shortage of fuel. Object of the campaign is to persuade domestic and commercial consumers to use electricity as little as possible during peak hours, and times announced by the B.B.C. Particular emphasis is laid on electric fires, and the first advertisement has appeared with the bold headline: "Cut That Out." Another fact stressed, is the priority need of industry, and this appeal is amply summed up by the slogan: "We must keep the factories going."

No additional space has been booked for the campaign as the new advertisements will supersede those already booked for the current "Peak Periods" series, and additional space, reserved for the "More Power in Action" campaign, which has been discontinued, will also be utilised.

J. & P. and T.C.M. Joint Cable Stocks

TO GIVE cable users an even better standard of delivery service, and in particular to enable them to deal with urgent requirements with the minimum of delay, Johnson and Phillips, Ltd., and the Telegraph Construction and Maintenance Co., Ltd., have pooled their manufacturing resources for the production of stock quantities of mains cables to established C.M.A. standards. By combining existing stocks and establishing a joint programme for future stock production, the two companies offer collectively a more comprehensive range of cables than hitherto, and will hold the stock items in larger quantities. The works or the nearest branch office or representative of either company will deal with enquiries, and whilst to implement the arrangement each company may supply cable manufactured by the other, the company effecting the sale will accept full responsibility under its normal conditions of sale for the material supplied.

Electrical Machines and Power

THE coming term's post-graduate course in electrical machines and power at Imperial College, South Kensington, has as its main feature two series of 15 afternoon lectures by Dr. J. R. Mortlock and Mr. B. Adkins of the British Thomson-Houston Co. Dr. Mortlock's lectures commence on Monday, January 15, and will deal with some transient problems in electrical power networks; they are an extension of the series delivered last winter. The lectures by Mr. Adkins commence on Thursday, January 11; he will present a new approach to the general theory for the analysis of the performance of electrical machines.

An allied course of 10 lectures dealing with the science of nuclear power is to be presented by Dr. O. Buneman, Mr. J. Diamond, and Mr. R. V. Moore of the Atomic Energy Research Establishment, on Friday afternoons at 4 p.m. commencing on January 12. A limited number of qualified external persons can be accommodated at these lectures following prior application and acceptance. Further particulars and forms of application may be obtained from Deputy Registrar, City and Guilds College, Exhibition Road, S.W.7.

Stage Lighting

SPEED was the keyword in the installation of dimmer-controlled fluorescent stage lighting at the Pleasure Gardens Theatre, Folkestone, carried out last month by Thorn Electrical Industries. Whereas in a similar contract at the Regent Theatre, Kings Cross (see our Nov. 30 issue), the installation was done while the theatre was closed, all work in the Folkestone theatre had to be completed between the final curtain on the Saturday night and rehearsals the following Monday morning. Nevertheless, the job was done and another new installation put into operation.

The scheme comprises a float, three battens and a cyclorama batten, together with fluorescent wing floods. The switchboard, which is still in the course of construction, is a four-colour board with dimmers arranged in four-colour rows. It is complete with cross grand master control, and accommodates dimmers for the auditorium lighting, the 1,000 F.O.H. pageants and incandescent

The First Half-Century

The pressing need of the new century is some device for overcoming the inertia of those local authorities that will persist in sitting on their Provisional Orders. For a dozen years now the obstructive local authority has had a very enjoyable time thanks for the complaisance of the Board of Trade. But the temper of Parliament is changing, and doubtless the policy of the Board of Trade will change in consequence therewith.—*From our issue of January* 3, 1901.

stage dips. It is anticipated that the new switchboard will be ready early in February but meanwhile the new equipment is controlled by temporary portable dimmer boards. As at the Regent, the total lighting load has been considerably reduced and now amounts to approximately 14·5 kW compared with the former consumption of 36 kW. This scheme is but the second of several new stage lighting installations being carried out by Thorn Electric during the winter months.

Staggering for Scottish Industry?

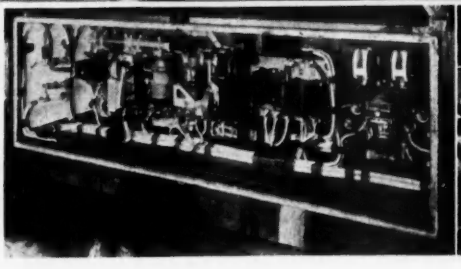
ASKING firms to make a 20% to 25% reduction in power consumption at peak periods, Bailie Charles Murdoch, chairman of the Scottish Board for Industry, stated that this re-introduction of schemes such as were operated last year, would mean a return to staggered hours and rota systems with their attendant problems. But the alternative, he pointed out, was a continuation of the present situation, which caused widespread loss of production and consequent loss of wages. In Scotland the power plant deficiency was in the region of 125,000 kW, but in severe weather 270,000 kW. He emphasised that for five hours a day power was exported to England, but was imported from England for the other nineteen hours.

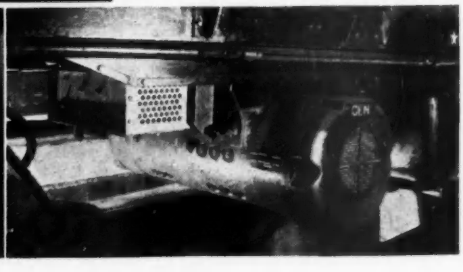
Generator for L.T.E. Rolling Stock

A NEW method of supplying power to fluorescent lamps installed in new rolling stock on London's Underground railway has been developed in recent months by Metropolitan-Vickers Co. Ltd. Nearly 180 sets of generator and regulator equipment, a notable feature of which is a dual-purpose motor generator, are now being supplied to the L.T.E. This machine consists of a 600 V driving motor and combined a.c. and d.c. generators, all in one compact frame which is conveniently housed in the underframe of coaches. It is capable of providing an a.c. supply for lighting as well as its already essential function of giving a d.c. supply for control circuits, door operation and battery charging. The d.c. output is 80 amps at 50 V and a.c. is at 110 V, or sufficient for 72 20-watt fluorescent lamps. There are 24 such lamps in each of the coaches, operated in parallel. Finally, mention must be made of another feature of the equipment, the voltage regulator. This is of the standard traction vibration type, used in a patented circuit, and operated on the motor field which is separately excited from the d.c. generator.

This Year's B.I.F. takes Shape

WITH the advent of a new year, the thoughts of many industrialists turn automatically to the annual British Industries Fair, to be held in 1951 from April 30 to May 11. It will be the 30th B.I.F., and we note that space allocations in all sections once again show considerable increases over its predecessors. In London, at Earls Court and Olympia, for instance, the increase is from 549,634 to 642,000 sq. ft, and allocations to date already exceed last year's total. All trade sections at these two venues are larger. At Castle Bromwich it is probable that the outdoor section will again be extended, but the outstanding feature will undoubtedly be the display of contractors' plant, where over 70 different types of machinery and equipment will be exhibited.





The interior of one of L.T.E.'s Underground coaches which are fitted with Metrovick power supply equipment for fluorescent lamps. Below left, is the voltage regulator panel and right, the dual-purpose a.c., d.c. motor generator set, both mounted on the car underframe

Three winners of E.E.B.'s Christmas Display Competition. Right is the Norwich window and below the Hertford display which gained first places among large and small Service Centres respectively. Winners of the Northmet sub-area competition were Wood Green whose display is reproduced bottom right

Teaching Technique

IN its fifth issue, the *Bulletin of Electrical Engineering Education* contains articles on subjects ranging from the technicalities of surges in transformer windings to the effectiveness as a teaching aid of film strips. There is, in addition, a further collection of details of helpful laboratory experiments. The foreword to the *Bulletin* records a further increase in the number of subscribers to this valuable publication, which is now "standing on its own feet." Information on the *Bulletin* can be obtained from Dr. Eric Bradshawe, College of Technology, Manchester 1.

Christmas Display Competition

THE Eastern Electricity Board again ran their seasonal Service Centre Display Competition this Christmas with a marked degree of success, and a notably high standard of presentation was achieved. Unlike the 1949 contest the Centres were judged not only on the attractiveness of windows, but also on the arrangement of showroom interiors. Competitors were segregated into large and small Centres, Norwich emerging triumphant in the former class, whilst among the smaller showrooms Hertford was credited with the highest number of points.

Halstead and Romford tied for first place in the competition held in the Essex sub-area, but in each of the other sub-areas there were clear-cut victories. In the Chilterns, Hemel Hempstead gained the honours and in the Fens, Saint Ives. First place in the remaining sub-areas went to Wood Green, Swaffham and Southwold. The winners are to be congratulated on their fine performances, but, we understand, other competitors were so close in the final assessment that the loss of first place was certainly no indication of a poor display.

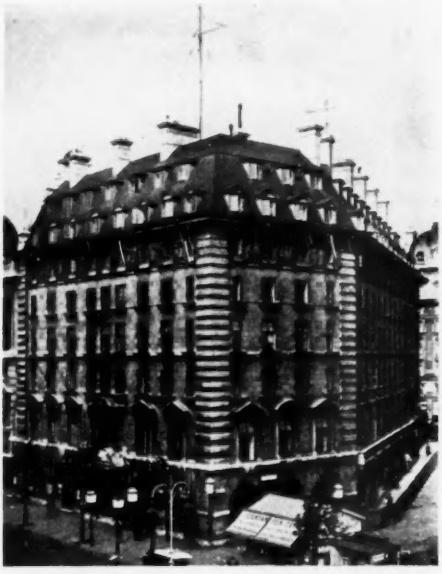
Distribution and Production

FORMS for the first Census of Distribution have now been despatched and should have reached traders early this week. Briefly the census covers all wholesale and retail traders, and among those exempt are hotels, places of entertainment, and business and professional services. These are excluded solely to prevent overloading the census offices. Traders should note that returns must be completed by March 31, 1951.

Three weeks ago we referred to plans being laid for the Census of Production for 1952, and we can now record that all establishments in the field of production, including builders and contractors, will take part. The subjects of power equipment and the use of fuel, and the amount of fuel purchased, are contained in the form of return, and this information is expected to be of value when assessing the increase in the use of power in industry since 1930, when the last data on the matter was collected. It is also anticipated that it will aid the study of productivity and for that reason questions are asked on shift working.

Cable Insulation Flame Resistance

SIMILAR designs of plastic and rubber insulated cables have been tested for flame retardent properties by the Fire Research Station, Elstree, and the results are given in a report issued by the sponsors of the investigation, the British Plastics Federation. In one series of tests a bunsen burner flame was played on a vertical length of cable. Polythene and covered p.v.c. cables neither con-



A photograph of Marconi House in the Strand (London) taken in 1924. Top right is the first 2LO which was used for broadcast transmissions from London in 1922, and bottom right a duet by Miss Olive Sturgess and Mr. John Huntingdon in the same year

veyed the flame nor continued burning for more than 35 seconds after removal of the test flame: rubber insulated cables did convey the flame along their length, and continued burning for more than a minute after the flame had been removed.

When a current of 12 times rated load was passed through the cables, both plastic and rubber coverings broke down, and thus introduced a shorting hazard. The report, which gives full details of the investigation, is issued as copyright publication No. 33, price 2s. 6d., by the British Plastics Federation, 47 Piccadilly, London W.1.

More Work at the Tramatorium

HAVING given Londoners over three months to adapt themselves to the first stage of the change-over from trams to buses, the L.T.E. are shortly to embark on the second step in the transformation. Trams will run for the last time along nine routes in South London on Saturday night and buses will take over immediately. The latest move in the overall plan to replace all London trams, is slightly larger than the first step, taken last September, when five routes were affected.

Shortly after the September change-over we referred to the newly-formed tramatorium at Charlton and we anticipate that employees there will be busy on a further assignment of over a hundred trams, bringing the total number of vehicles withdrawn from service to 188. By next Saturday a total of 240 buses will have been brought into service to replace the trams which formerly operated on 14 routes.

A Link Re-forged

THE re-occupation of Marconi House in the Strand by Marconi's Wireless Telegraph Co. Ltd. and the Marconi International Marine Co. Ltd. re-forges a link with the early days of broadcasting, broken in 1933 when the registered offices were moved to Electra House, and the Air Ministry, who took over their old premises, re-named it Ariel House. It was on the seventh floor of this building that broadcasting from 2LO commenced in 1922 before the B.B.C was formed and the move to Savoy Hill took place.

As from January 1, the export department of Marconi W/T Co. and the Contracts Division of the Marine company, will be housed in Marconi House (Tem 1577).

A.M.E.E. Salary Scale

THE VALUE of the salary scale which was negotiated by the Association of Municipal Electrical Engineers (now the Association of Managerial Electrical Executive) in 1941 and recognition of which was secured in proceedings before the National Arbitration Tribunal prior to Vesting Date, was finally sustained in recent proceedings before the Ministry of Labour and National Service Compensation Appeals Tribunal.

Mr. R. C. Golding, formerly borough electrical engineer of Southend, appealed against the Eastern Electricity Board's refusal to pay him compensation for the loss sustained by him on account of

the withdrawal of this salary scale. His claim was based on the fact that he was appointed by Southend Corporation under the A.M.E.E. salary scale which provided for the payment of a salary based on the number of units sold annually. When the Electricity Board withdrew the scale as a method of remuneration he suffered a worsening of conditions of service.

The compensation awarded to Mr. Golding for loss under this heading was an annual sum of £113 14s. 7d. Many A.M.E.E. members who have suffered worsening of conditions of service in this respect, as a result of nationalisation, will be gratified at this result.

L.D.C. Reorganises

SHAREHOLDERS of Lancashire Dynamo and Crypto Ltd. have approved a resolution changing the company's name to Lancashire Dynamo Holdings Ltd. Incorporated in 1899, Lancashire Dynamo and Crypto Ltd. has acquired a number of subsidiary companies, including interests overseas. These undertakings now represent a considerable part of its activities, and it is felt that substantial administrative advantages will be achieved by changing the parent firm to a holding company.

To coincide with this change of name a new company has been incorporated and will be known as Lancashire Dynamo and Crypto (Mfg.) Ltd. This company will be a wholly owned subsidiary and will operate and ultimately acquire the manufacturing business at present operated as Lancashire Dynamo and Crypto Ltd.

The Board of this new subsidiary will consist of H. W. Bosworth, A.M.I.E.E., chairman; D. C. Lorkin, F.C.I.S., and A. W. A. Dick-Cleland, M.I.E.E., joint managing directors; F. F. H. Schroeder, A.M.I.E.E., and W. G. Swain. The directors have decided that the parent company, whose directors remain unchanged, and the new subsidiary company, will, as from January 1, trade as a partnership in the name of Lancashire Dynamo and Crypto.

Christmas and New Year Greetings

OWING to pressure on space in our last issue, we were unable to acknowledge the numerous Christmas and New Year greetings received from so many of our friends in the industry. Our thanks are no less sincere, however, for the short delay, and we take this opportunity of reciprocating the good wishes extended by the New Insulation Co. Ltd., Exide and Drydex Batteries, Royal "Ediswan" Lamps, British Vacuum Cleaner and Engineering Co., Venner Time Switches Ltd., and Dowsett Holdings Ltd.

NEWS IN BRIEF

The Princess Tsahai Memorial Hospital is seeking an electrical engineer qualified to install and supervise the working of machinery in the all-electric hospital at Addis Ababa. The appointment will involve a year's stay in Ethiopia, and among the engineer's duties will be the training of a successor. The new hospital has been fitted throughout with British material and electrical equipment supplied by G. N. Haden and Sons.

The London Electricity Music Society gave an admirable performance at the Kingsway Hall just before Christmas. The show included works by Mozart, Schubert and Beethoven, and the popular Hallelujah Chorus from Handel's *Messiah*. It was the Society's first concert and will undoubtedly do much to increase the membership and popularity of this eight-month-old orchestra.

The third residential national conference of the Institution of Works Managers will be held at Southport from April 13 to 15.

The annual meeting of the Northern Counties Area of E.I.B.A. will be held at Carliol House, Pilgrim Street, Newcastle-on-Tyne, at 3 p.m. on Thursday, January 18.

The sixth annual dinner of Johnson and Phillips Ltd., held at the Lyceum (London), was also an occasion to celebrate the 75th anniversary of the firm's foundation. Over 800 members of the staff and guests were present, and after dinner, dancing continued into the early hours of the morning.

A steward takes one of 525 electrically heated food and liquid containers, being supplied by the G.E.C. to British European Airways, aboard his air-liner. The container is an insulated double-sheeted metal box, 16 in. high by 8 in. square. Production unit requires a heating element rating of only 200 W

Electric Supply News

Belfast

The discount to consumers is to be reduced from 10% to 5%.

Cumberland

The North-Western Electricity Board has promised to supply electricity during 1951 to the village of Holme St. Cuthbert, provided no further cuts are made in capital expenditure for electrical developments. The scheme is also expected to include parts of other nearby parishes.

North of Scotland

The year 1949 was one of remarkable achievement by the North of Scotland Hydro-Electric Board. Some 20,000 householders were linked up with one or the other of the Board's new generating stations. Whereas in 1949 hydro-electric power in the area supplied only 31% of the demand, it now provides 60%. The coming summer, the Glen Affric project will be opened, and in addition several local schemes to supply smaller Highland communities will be inaugurated. The first of these will be in Cowal, where a power station at the head of Loch Striven will supply Bute and Cowal. The Glen Lussa scheme, near Campbeltown, will carry power through Kintyre, and a power station at Gair Loch will meet the requirements of Wester Ross. The most isolated scheme in Scotland is at Storr Lochs, in Skye. When it is opened this year the water will be taken over a cliff to a power station on the shore.

Malvern

The Midlands Electricity Board is holding a conference at Malvern today to discuss the controversial question of erecting electricity pylons over the Malvern Hills. Various organisations affected by the proposals have been invited to attend the discussions.

Poole

At the recent meeting of the Avon and Dorset River Board, it was reported that spawn from mussels is being carried into the B.E.A.'s new generating station at Poole, where it develops rapidly. To prevent serious damage to the plant, the Authority propose to carry out heavy chlorination of the water. The River Board decided to support representations by the Southern Sea Fisheries Board to the B.E.A. on the ground that such chlorination would be detrimental to the fisheries.

S.E. Scotland

The Area Electricity Consultative Council was recently told that coal for Portobello power station had been carried from Fife to Granton and Leith, at a cost of £7,900 more than if it had been taken by rail. It was stated that up to September 6, 4,000 tons were shipped from Methil to Granton and 12,500 tons via Leith. Cost by sea was about 17s. 9d. a ton, and by rail 8s. 2d. a ton. The South East Scotland Division has explained that, in this matter, they were almost completely in the hands of the National Coal Board who were in a position to adduce emergencies within their own marketing organisation as reasons for departing from what appeared to be the most economical method of supplying the needs of this Division. Such an emergency recently resulted in the Division agreeing, as a purely temporary measure, to take Fife coal which in the ordinary way would have been shipped to other markets. The first shipments occurred in July at a time when the N.C.B. were very much behind in our winter coal stocking deliveries. On the question of shipment, the Division stated that the coal came from the Wemyss collieries washery and was loaded into traffic waggons which could only go as far as Methil. The first consignment was delivered to Granton because Leith could not handle it, but one of the conditions the Division attached to accepting further deliveries was that they should come in to Leith. The N.C.B. said supply could not have been made up at the time from Lothians coal. Reasonable stocks have now been accumulated at Portobello, and further shipments were refused.

S.W. Scotland

As a contribution to the problem of easing load shedding, the South-West Scotland Board has ceased to display and sell electric radiators, and has asked consumers to refrain from using such appliances during daytime.

Wales

A letter from the clerk of the River Wye Catchment Board concerning proposals of the B.E.A. to extract water from the River Wye above Llangurig for hydro-electric purposes, was considered by the Hereford Corporation at its recent meeting. The report of a meeting between the B.E.A.'s hydro-electric engineer, Mr. J. Warnock, and the Board's consulting engineer, Major G. N. Croker, was also given consideration, and in view of the implications arising from the proposals, it was decided to call a conference of interested authorities with a view to considering policy and procedure regarding the scheme.

LIGHTING SCHEMES

Aberdeen.—The Lighting Committee has decided not to convert gas-lit streets to electricity because of the cost. More than 60% of the city's lighting is gas. Streets in new housing areas are lit by electricity.

Blyth.—The T.C. is to consider the greater use of electricity in place of gas, for street lighting.

Bridlington.—The T.C. is making provision for £1,500 to be spent on decorative lighting on the seafront next summer.

Burnham and Highbridge.—The South Western Electricity Board is to undertake a survey of street lighting for the U.D.C. with a view to improvements being made.

Cheltenham.—The T.C. has been recommended to approve a scheme for lighting Hatherley Lane estate, at a cost of £1,118.

Clayton-le-Woods.—The parish council has approved a scheme for electric street lighting at a cost of £2,508.

Gosforth.—The U.D.C. has approved a scheme for electric lighting in High Street and part of the Great North Road, at a cost of £3,445.

Hastings.—Following meetings between the Highways and Works Committee and representatives of the South Eastern Electricity Board, the committee has decided to adhere to its previous decision that the Corporation should carry out its own public lighting arrangements.

Kendal.—Having received £6,101 as compensation after nationalisation of the town's electricity and gas undertakings, it is proposed to utilise the sum on improved street lighting.

Ministry of Transport approval has been received to the installation of a three-tube fluorescent lighting system for Highgate and Stricklandgate and 400 W mercury lighting on the outer sections from Gillinggate to Lumley Road on the south and from Sandes Avenue to Kendal Rugby ground Shap Road, on the north.

Liverpool.—A deputation has visited Rotterdam to study lighting arrangements which might be applicable to the Mersey Tunnel.

Manchester.—The city General and Parliamentary Committee is considering a £3,000 plan for floodlighting public buildings in connection with the Festival of Britain.

Ramsgate.—The T.C. has approved a scheme of illuminations for 1951 in connection with the Festival of Britain celebration, cost £12,600.

Richmond (Surrey).—The Highways Committee has recommended that subject to the approval of the Ministry of Transport: (*a*) the system of fluorescent lighting be installed in Kew Road, The Quadrant, George Street and Hill Street; and (*b*) that fluorescent lighting be also installed in Kew Road from the junction with Selwyn Avenue to Richmond Circus.

Romford.—T.C. approved the conversion from gas to electricity of lighting in Fairholme Avenue, Wallenger Avenue, and Crowland Avenue, at a cost of £2,737.

Scarborough.—A proposal to light the Marine Drive and Royal Albert Drive by electricity at a cost of £12,000 has been made by the Water and Streets Committee.

Southend-on-Sea.—The T.C. has approved in principle a scheme for illuminations similar to that of this year.

Sutton and Cheam.—Application has been made to the Ministry of Health for sanction to borrow £20,980 for improved street lighting.

Trowbridge.—First section of the new street lighting scheme has been completed. Work on the second part is under way, and the third part is in the course of detailed preparation.

Wandsworth.—The borough engineer's plans for modernising street lighting have been held up for the time being. The Council is negotiating with the Ministry of Transport on the matter.

Company Activities

Aeronautical & General Instruments Ltd.

Operations for the year to March 31 last resulted in a group net loss of £14,438, as against a net profit of £13,962 in the previous twelve months. There is £23,579 brought in, plus £48,812 profit on sale of buildings, and £12,911 tax not required and recoverable. To special stock provision £10,000, current tax £955, future tax £1,575, and general reserve £35,000. After payment of dividends (Ordinary, nil), there is £19,621 carried forward.

Pye Ltd.

The directors are seeking to raise additional capital. An extraordinary general meeting is called for January 19, at which stockholders will be asked to approve the creation of 750,000 Cumulative Preference shares of £1 each and 1,600,000 Deferred Ordinary shares of 5s. each. The Preference shares are to be issued for cash on terms yet to be fixed; of the new Deferred shares, 864,266 are to be allotted by way of bonus to holders of the existing 864,266 Deferred stock units, in the proportion of one for one. This issue will involve the capitalisation of £216,066 from reserves. The issue is, of course, subject to the consent of the C.I.C.

Rhodesian Cable Ltd.

For the year to June 30 last, the net profit amounted to £31,726. Taxation absorbs £1,500 and there is £26,233 carried forward after deducting the debit balance of £3,993 brought in from the previous year.

Hoover Ltd.

The resolution for increasing the capital to £2,600,000 by the creation of 3,840,000 new 5s. Ordinary Shares and 800,000 new "A" 1s. Ordinary shares, and the capitalising of £975,000 of reserves for the 100% scrip bonus, was approved at last Thursday's extraordinary general meeting.

General Cable Manufacturing Co.

An appreciable contraction in the demand for cables during the past year, while sales prices fell as a result of severe competition between manufacturers both in the home and export markets, declared Mr. C. W. R. Pantlin, chairman, at this meeting last Thursday. At the same time production costs rose with advancing prices of raw materials. Yet the company increased its sales turnover over that of 1949 by more than 15% in sterling value and 30% in volume. The lot of the cable manufacturer is not a happy one, he said, since to the handicap of selling prices lagging behind manufacturing costs, which necessitates additional working capital and creates other problems, is now added the prospect of shortages of raw materials.

Commercial Information

CONTRACTS OPEN

HOME

Jan. 5.—Belfast. Electricity Dept. require supplies of materials, including static transformers, 6,600 V armour-clad switchgear, overhead line materials, copper covered and rubber insulated cables, street lighting fittings and ancillary equipment, cookers and lamps. Dept.'s address is East Bridge St., Belfast. (See Dec. 7 issue.)

Jan. 5.—Maidstone T.C. Electrical installation in 52, 28 and 14 houses on Shepway housing estate. Separate contracts. Borough Surveyor, Palace Ave.

Jan. 5.—Norwich. Wireless and electrical installations for Lakenham secondary modern school. City Architect, Cory Hall, Norwich.

Jan. 6.—Banff. Electrical work in erection of garages for Territorial and Auxiliary Forces Assoc. G. J. Lobban, Architect, 166 Mid St., Keith.

Jan. 6.—Blackpool T.C. Supply of (a) motor driven (petrol) 3-ton chassis for Tower Body; (b) sectional Tower Body with power elevation fitted on chassis, (c) four sectional trailer-type Tower ladders. Separate specifications from Illuminations and Public Street Lighting Officer, Electrical Services Dept., Rigby Rd. East, Blackpool. (See Dec. 28 issue.)

Jan. 6.—Dagenham. Electric lamps are included in a list of supplies required by the Council during the year beginning April 1, 1951. Applications should be made to Borough Engineer and Surveyor.

Jan. 6.—Walsall. Supply of electrical equipment for Footherley Hall residential nursery. L. J. Joseph, Children Officer, Children Dept., 29 Leicester St., Walsall.

Jan. 8.—Baldock (Herts.) U.D.C. Provision and erection of street lighting units on concrete columns. Council's Engineer and Surveyor, Council Offices. Deposit £2 2s.

Jan. 8.—Billingham U.D.C. Street lighting works as part of Rosebery Rd. development scheme. Eric G. Lediard, Chartered Civil Engineer, 4 Eldon Square, Newcastle-on-Tyne 1. Deposit £5 5s.

Jan. 8.—Burnley T.C. Electrical installations in Rosegrove and Eastern Av. Nursery schools. Borough Engineer and Surveyor, 22-24 Nicholas St.

Jan. 8.—Durham. Electrical installation in proposed hostel at Winlaton. Applications by the above date to the County Architect, Court Lane, Durham.

Jan. 8.—Hastings T.C. Electrical installation in 116 houses at Hollington. Borough Engineer, 37 Wellington Square, Hastings. Deposit £2 2s. (See Dec. 14 issue.)

Jan. 8.—Liverpool. Electrical installation in Harrington County Primary School. City Engineer and Surveyor, Municipal Buildings, Dale Street, Liverpool.

Jan. 9.—Buckhaven and Methil T.C. Electric light in 42 houses in Cemetery Rd., Methil. Architect for 26 houses is E. L. Forsyth, Methil Brae, Methil, and for remaining 16, Peter Sinclair, Wellesey Rd., Methil.

Jan. 9.—Dewsbury T.C. Overhauling and maintaining Town Hall loudspeaker and amplification system. Borough Architect and Buildings Surveyor, Town Hall.

Jan. 11.—Belfast. Electrical installation at Whitehouse Old People's Home for City Council. City Surveyor's Dept. (Architectural Section), Room 85, City Hall, Belfast. Deposit £3 3s.

Jan. 12.—Kidderminster. Installation of new radio equipment for (approx.) 90 beds at Kidderminster General Hospital, Hospital Administrative Officer, Mill St., Kidderminster. (See Nov. 23 issue.)

Jan. 12.—Pudsey. The supply of 20 cwt. electric trucks included among items of plants. Borough Surveyor, Town Hall.

Jan. 13.—Durham. Electrical installations in 20 schools. Form(s) of tender from County Architect's Office, Court Lane, Durham.

Jan. 13.—Felling U.D.C. Supply of 76 2 kW electric fires for houses on Ellen Wilkinson estate, Wardley. Tenders to T. Myrddin Baker, Clerk of the Council, Council Buildings, Felling, Gateshead 10.

Jan. 13.—Sutton and Cheam. Supply and erection of automatic electric sewage pumping plant, comprising three vertical spindle centrifugal pumps, motors, starter panels, etc. N. H. Mitchell, Borough Engineer and Surveyor, Municipal Offices, High St., Sutton. Deposit £2 2s.

Jan. 15.—Cork. Electrical installation in additional classrooms at school at McCurtain St. B. O'Flynn and Son, 60 South Mall, Cork. Deposit £20.

Jan. 15.—Fife. Electrical installation in a block of 18 flats at Kennoway. Surveyors, Wilkinson and Lowe, 2a Chalmers St., Dunfermline.

Jan. 15.— Wrexham R.D.C. Wiring for electric light and power in 26 houses at Llay, 24 at Ruabon, 22 at Rhos, and 18 at Rhostyllen. D. E. Edwards is engineer and surveyor, Imperial Buildings, Regent St., Wrexham. Deposit £2 2s.

Jan. 16.—Kearsley U.D.C. Supply and erection of street lighting columns and installation only of lanterns, control gear and wiring. Also supply of lanterns and auxiliary equipment. Engineer and surveyor, E. C. Kirk. Deposit £2.

Jan. 18.—Huntingdon. Wiring for electricity of following houses: 1-10 Stow Rd., Spaldwick; 1-2 Easton Rd., Easton; 1-4 Church Lane, Brington; 1-2 Thrapston Rd., and 1-4 Grafham Rd., Ellington. Surveyor, Montagu House, Huntingdon.

Jan. 19.—Beckenham (Kent). Jobbing work in electrical trades included in list of works for period beginning April 1, 1951. Borough Engineer, Town Hall.

Jan. 19.—Belfast. Supply and erection of (*a*) CO_2 fire fighting equipment for protection of 6,600 V switchgear and (*b*) 33 kV and low voltage cables, for Harbour power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit on each is £5 5s. (See Dec. 14 issue.)

Jan. 24.—Metropolitan Water Board. Supply and delivery of a main l.t. switchboard at pumping station at Ashford Common, Middx. Board Offices at New River Head, Rosebery Ave., E.C.1. Deposit £1 1s. (See Dec. 14 issue.)

Jan. 29.—West Riding. Renewal of electrical installation at Rothwell grammar school. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £1 1s.

Jan. 30.—Belfast. Supply and erection of trolleybus overhead line equipment. Documents from Transport Dept., Sandy Row, Belfast.

Feb. 2.—Belfast. Supply and erection of CO_2 fire fighting equipment for protection of 33 kV switchgear. Merz and McLellan, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (Advertised in this issue.)

Feb. 3.—Colwyn Bay. Supply and erection of two electric centrifugal booster pumps. Borough Engineer, Town Hall.

Feb. 5.—Bridge of Allan. Supply and installation of 42 street lighting columns, wiring and fixing of lanterns with sodium lamps and gear, time switches, etc., in Henderson Street (A.9). John B. Craig, Burgh Surveyor's Office. Deposit £2 2s.

No date stated.—Newcastle-upon-Tyne, T.C. Electric lighting installation in a total of 770 existing Council houses, in groups of approximately 100. Applications to city architect, 18 Cloth Market, Newcastle-upon-Tyne 1

No date stated.—Morpeth T.C. Tenders being obtained for installation of electricity in 175 houses at present supplied with gas. Borough Engineer, F. K. Perkins, Bridge St., Morpeth.

No date stated.—Fleetwood. Electrical installations in 74 houses at West View estate. Borough Surveyor, Town Hall. Deposit £3 3s.

No date stated.—Wigton (Cumb.) R.D.C. Electric wiring of 24 council houses at Silloth. Surveyor, Council Offices, George St., Wigton.

No date stated.—Glenrothes. Electrical installation in 6 shops and 10 houses at Woodside. Apply to Secretary, Glenrothes Development Corp., Woodside, Glenrothes, nr. Markinch, Fife.

No date stated.—Houghton-le-Spring (Durham) U.D.C. Tenders being obtained for electrical equipment for proposed conversion of Houghton Rectory into council offices. Surveyor is W. H. Smith, Newbottle St.

No date stated.—Leslie. Electrical work in alterations and additions to 16 houses at Mansfield. Applications to A. D. Waxton and Watson, Architects, Leven.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Jan. 15.—India. Director of Commerce for Industries Dept. at Hyderguda, Hyderabad-Deccan, invites tenders for 80 h.p. diesel engine driven with electric starting equipment; 20 8 h.p. vertical cold start diesel engines; two diesel-driven portable compressors. B.o.T. (Ref. CRE (IB) 73810/50)*.

Jan. 15.—Winnipeg. A 25,000 kW generator and steam turbine plant for extension to Winnipeg power supply. Tender covers design, manufacture and erection of the plant, with all auxiliary equipment. Preliminary test runs to be made by Sept. 1, 1953. B.o.T. (Ref. CRE (IB) 10669/50).*

Jan. 18.—Uruguay. An a.c. generating set of approx. 10 kW, 220 V, driven by gasolene or diesel engine, with a maximum speed of 1,500 r.p.m. Administracion Nacional de Combustibles Alcohol y Portland, Casilla de Correo 1090, Montevideo. B.o.T. (Ref. CRE (IB) 73575/50).*

Jan. 24.—Wellington, N.Z.). Director-General (Stores Division) G.P.O., invites tenders for supply of 9,000 insulator spindles, 138,000 bolts, 10,000 threaded mild steel rods, 1,500 stay rods and 10,000 pole steps.

Jan. 31.—S. Rhodesia. Six distribution transformers of 200 kVA, and four 300 kVA to be used initially on a 6,600 V system and ultimately on an 11,000 V system, for Municipal Stores Siding, Park River Estate, Umbali. Tender No. E.21/1950 must be quoted.

Jan. 31.—Tangiers. Water and Electricity Services Administration of the Zone of Tangiers invites bids for supply of equipment for two transformer stations. Tenders to Chief Engineer of the Administration, Rue Vermeer. Documents obtainable from Engineer to the Electric Grid, Rue Vermeer, on payment of 650 francs.

Feb. 6.—Ceylon. Ministry of Industries, Colombo, invite tenders for establishment of caustic soda and by-products factory at Salterns. Contract includes provision of quotations each of the following power and steam raising methods: pass-out turbines; diesel generation with waste heat boilers; diesel generation for power with separate boilers for steam generation.

Your Queries — Answered

"Selecta" bench grinders, makers of? D.N.—B. Elliott and Co. Ltd., Victoria Works Victoria Rd., N.W.10. (19239)

"Sally" fires, makers of? E.B.—These fires are no longer being made but spares are available from the distributors, Lumex (Gt. Britain) Ltd., Marylebone High St., W.1. (19245)

"National" vacuum cleaners, makers of? E.B.—National Utilities Ltd., 8 South King St., Manchester 2. (19261)

Superior Electric Ltd. of Canada, agents for? B.C.—J. M. Duncan Ltd., 92 York St., Glasgow. (19266)

"Morris" heaters, makers of? C.A.—Morris Heating Appliances Ltd., 5 Netherton Grove, S.W.10. (19227)

"Uva" Products Ltd., address of? H.E.—9 Primrose Hill St., Coventry. (19269)

"Ingraham" clocks, agents for? E.E.—Britannia Electric Lamp Works Ltd., 14 Sunbeam Rd., N.W.10. (19273)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

15 V lamp with a Lilliput (5 mm) screw, makers of? K.S. (19274)

Electricity is not available from outside sources. B.o.T. (Ref. CRE (IB) 8912/50).*

Feb. 23.—Buenos Aires. Water and Electricity Dept. of Argentine Ministry of Industry and Commerce invites tenders for supply and erection of 20,000 kW generating plant. Specifications from Oficinas de Talleres y Suministros, Lavalle 1556, Buenos Aires.

CONTRACTS PLACED

Ipswich. Electrical engineering services in sanatorium for E. Anglian Regional Hospital Board. Mann, Egerton and Co. Ltd., £2,212.

Omagh (Tyrone) R.D.C. Electrical work in 12 bungalows at Beragh, J. Charleton, £1,398.

South Shields. Electrical work in Limonsode county infants' school. Law and Burns, £1,631.

Thornaby-on-Tees T.C. Electrical installation in 40 houses on Thornaby Rd. estate. J. Bushel and Sons, £907.

TRADE NOTES

Metal Prices.—As from Jan. 1, the price of virgin aluminium, 99-99·5% purity, was increased by £4 to £124 a ton. The selling prices of the Ministry of Supply for copper refined in the U.K. in special shapes and to special specifications were also advanced by up to £2 17s. 6d. a ton, from that day.

A new Iron and Steel Prices Order raises the maximum prices of bolts and nuts, set screws, studs and washers.

Measurement Ltd. announce that owing to the growth of activities in remote control and indication fields, they have formed a Remote Control Division which is now operating from 7 Fitzalan St., Kennington, London S.E.11. Its director and manager is Mr. F. C. Z. Crosse, B.SC., M.I.E.E.

New Branch. Enfield Cables Ltd. have opened a new branch at 124 Broad St., Hanley, Stoke-on-Trent. Telephone Hanley 1310.

New Offices. Brush Export Ltd., which was recently formed with its head office at Loughborough to handle all export business of the Brush Electrical Engineering Co., Ltd., has opened its own London Office in Duke's Court, Duke St., St. James's, S.W.1, headquarters of the Brush/ABOE group of Companies. Its first manager is Mr. C. W. Glanister, M.I.E.E., whose appointment we noted on Oct. 12.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

				New York price
COPPER, electrolytic	202	0	0	£196 0 0
Delivered in 2nd and 3rd month after order	215	10	0	—
Delivered in 4th, 5th and 6th month after order	217	0	0	—
LEAD, good soft pig (foreign)	136	0	0	136 0 0
" " " "English" quality	137	10	0	
Delivered in 2nd and 3rd month after order, plus	7	0	0	
TIN (99-99.75%) ...(Cash)				—
" (3 months)				—
ALUMINIUM, commercial purity (del.)	124	0	0	—
ZINC	151	0	0	140 0 0
ARMOURING:				
Galv. Steel Wire (0.104 in.)	45	10	0	—
Mild Steel Tape (0.04 in.)	26	0	0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Calamco Ltd. Resolution passed at meeting on Dec. 12 for voluntary winding-up. Arthur Smith, 5 Cross St., Manchester, was appointed liquidator.

Llanfair Caereinion Electric Society Ltd. Resolution passed at meeting on Dec. 18 for voluntary winding-up. A. Harold Morgan, of Crown Chambers, 18 Market St., Newtown, Mon., was appointed liquidator.

Intended Dividend

Chelmsford. Jacob Barnett and Maurice Barnett, trading together as "Barnett Supplies Co." at 102 and 104c Cranbrook Rd., Ilford. Last date for receiving proofs, Jan. 15. Trustee is Norman William Osborne, 11-12 Finsbury Sq., E.C.2.

BANKRUPTCY ACTS

Receiving Order

Aylesbury. Leonard George Sharp, electrician, of 4 Summerley's Rd., Princes Risborough. Date of receiving order, Dec. 14.

Order on Application for Discharge.

Bournemouth. Aubrey S. F. Carpenter, trading as retail radio dealer under name of "Stourvale Radio Stores." Date of order, Oct. 20. Bankrupt discharged subject to judgement against him for £50.

First Meeting

Dewsbury. Arthur Ball, electrical engineer, of 10 Wild Bldgs., Birstall. First meeting at Official Receiver's offices, 71 Manningham Lane, Bradford, on Jan. 5 at 11 a.m. Public examination at County Court House, Eightlands, Dewsbury, on Feb. 15 at 10.30 a.m.

London. Lewis George Stoakes, formerly a technical publisher and radio engineer, lately trading with another as "Electronicraft Publications" at 45 South Audley St., W.1. First meeting at Bankruptcy Buildings, Carey St., W.C.2, on Jan. 9 at 11.30 a.m., and public examination at same address on Feb. 13 at 11 a.m.

Companies Winding-up

Barwell Electrical Products, Ltd., 255 Earlsfield Rd., Wandsworth, S.W.18.

First meeting held recently at Inveresk House, Strand, W.C.2, when Official Receiver reported that winding-up order was made on Nov. 20. The company was formed in August, 1946, with capital of £1,000, of which £957 was issued, to acquire an existing business. Draft statement of affairs disclosed unsecured liabilities of £2,794, and in addition there was £15 due in respect of preferential claims and £250 to a debenture holder. Assets were estimated to produce £220. Matter left with Official Receiver as liquidator.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

Grubb Electrical Co., Ltd. 72 Leadenhall St., E.C.3. To take over business of electrical engineers, carried on as Grubb Electrical Co., at 72 Leadenhall St., E.C.3. Nom. Cap.: £1,000 in £1 shares. Dirs.: S. E. Grubb and Mrs. F. M. Grubb, H. J. Harrison and J. Mepham.

Hamilton Cole (Bicester) Ltd. 79 Sheep St., Bicester, Oxon. Electricians, mechanical engineers, etc. Nom. Cap.: £1,500. Permanent Dirs.: G. H. Cole, and F. J. Sandell.

Mallett's Baffles Ltd. 25 Riggindale Rd., Streatham, S.W. 16. Designers and manufacturers, contractors and constructional engineers for power plants of all kinds, etc. Nom. cap.: £1,000. Dirs.: S. A. Mallett, Col. C. Alexander, G. S. Sim and A. E. Chester.

BUSINESS PROSPECTS

HOME

Axminster (Devon) R.D.C. Erection of 98 houses and bungalows and two shops is included in plans of Chard Road Hospital Camp.

Beccles T.C. Erection of 28 houses at Kemps Lane. Housing Surveyor, Town Hall.

Birkenhead T.C. Erection of police headquarters in Mortimer St. approved. Cost estimated at £60,000.

Carlisle. Tenders being obtained for erection of 90 houses on Harraby estate. City Engineer, 18 Fisher St.

Chesterfield T.C. New housing estate, Chatsworth estate, is to be developed, and will include shops, hostel and a school.

Coleraine (Londonderry) R.D.C. Application made for sanction to borrow £410,000 for erection of 300 houses.

Darlington T.C. Council to borrow £22,190 for 20 flats at Haughton South site, £29,100 for 22 houses on same site, £15,790 for 12 houses at Haughton South, and £5,710 for 6 houses at Haughton North.

Doncaster. Plans approved for N.C.B. offices in Thorne Rd. at estimated cost of £40,000.

Down. Plans approved for erection of primary school in Donaghadee.

Filey U.D.C. Erection of 43 houses on Muston Rd. site. Architect is F. Vaux, 31 Quay Rd., Bridlington, Yorks.

Gosport. Erection of 89 houses on Rowner estate. Borough Engineer, Town Hall.

Gravesend T.C. Provision to be made in layout plans for erection of 280 flats and 420 houses on Westcourt estate.

Guildford R.D.C. Council has provisionally approved installation of electricity in 72 houses at estimated cost of £2,000 in 72 houses at Ash.

Hailsham (Sussex) R.D.C. It is proposed to build 40 houses at Hailsham, 12 each at East Dean and Ninfield, 6 each at Alfriston and E. Hoathly, and 4 at Warbleton.

Hebburn-on-Tyne U.D.C. Erection of 80 houses in Victoria Rd. East, and 60 in Mill Lane. Council's Architects are T. A. Page, Son and Hill, 75 King St., S. Shields.

Hungerford (Berks) R.D.C. Twenty houses to be built at Bulpitt Lane, 4 at W. Shefford, and 2 each at High St. and Prospect Rd.

Littlehampton U.D.C. Erection of 44 houses and 8 bungalows on Wickbourne estate.

London. Bell Property Trust Ltd. proposes to build 65 flats and 10 shops in Streatham High Rd. E. A. Stone and Partners, architects, 20 Berkeley St., W.1.

March (Cambs) U.D.C. Plans approved for erection of 100 houses on Badgeney and Deerfield Rd. site.

Middlesbrough. Erection of Stainsby secondary schools, comprising two schools on a site of 43 acres. Apply to Director of Education, Education Offices, Woodlands Rd., Middlesbrough.

Newbury T.C. Plans approved for erection of 126 houses on Love Lane site.

Newton Aycliffe (Durham). Tenders being obtained by Aycliffe Development Corp. for erection of 17 houses on Clarence Farm West site. Grenfell Baines Group, Simpasture, Newton Aycliffe.

Northamptonshire. Erection of Technical Institute at Kettering and county infants' school at Corby, also extensions to Tennyson Rd., county modern school. Separate contracts. County Architect, County Hall, Northampton.

N. Ireland. Construction of 45 houses at Broughshane, Co. Antrim for N. Ireland Housing Trust. Trust Offices, 12 Hope St., Belfast.

North Riding. Plans approved for primary school at Romanby, Northallerton. D. W. Dickenson, County Hall, Northallerton.

Peterborough. Erection of 100 houses on Eastfield estate. Contracts to be let in six groups. City Engineer's Office, Town Hall.

Portsmouth. It is proposed to build three blocks of 27 flats at Paulsgrove, block of 45 flats at Landport, and 12 flats also at Landport.

Reading. Erection of 60 flats in Gosbrook Rd. Borough Architect, Town Hall.

Ruislip-Northwood U.D.C. Erection of 48 flats at Southcote Rise. Engineer and Surveyor to the Council, Council Offices, Oaklands Gate, Northwood.

Saltburn U.D.C. Tenders to be invited for erection of 36 houses in Irvin Ave. Surveyor is W. R. Ellis, Council Offices.

Thurrock (Essex) U.D.C. Tenders shortly to be invited for erection of 210 houses at Corringham for Shell Oil employees.

Todmorden. Erection of 48 houses on Harley Wood estate. Borough Surveyor, Municipal Offices, Todmorden.

Tynemouth. T.C. is pressing for approval for installation of traffic lights at junction of Northam and the Coast Roads.

Wallasey. Construction of county infants' school. Borough Architect, Town Hall.

Watford T.C. It is proposed to erect shops and flats at junction of St. Albans Rd. and High St. for Watford Ideal Homes Ltd.

Wakefield. Erection of a block of 18 flats in George St. City Engineer's Office, Town Hall.

Weymouth and Melcombe Regis. Erection of 134 houses on Downclose estate. Borough Engineer and Surveyor, 6 Pulteney Buildings, Weymouth.

West Ashford (Kent) R.D.C. Erection of 44 houses at Charing. Estimated cost is £55,821.

Westmorland. Erection of Kendal - Kirkbarrow infants' school for C.C. R. H. Crompton, county architect, County Hall, Kendal.

Whitehaven. T.C. to apply for sanction to borrow £335,068 for erection of 240 houses on the Valley estate.

Wokingham (Berks) R.D.C. It is proposed to erect 38 houses on Shinfield Rise estate and 32 on Cricket Hill site, Finchampstead.

OVERSEAS

Canada. R. L. Brews and Son, 1324 11th Avenue West, Calgary, wants to undertake representation in Alberta of U.K. manufacturers of porcelain enamel reflectors and street lighting equipment.

Also Renold-Coventry of 1006 Mountain St., Montreal, are anxious to find U.K. manufacturers of fractional h.p. electric motors. The firm requires an agency for the motors. Interested British companies are asked to contact a Mr. Cole.

Venezuela. Libreria Nuevo Mundo of Calle Real de Sabana Grande No. 112, Caracas, wants to contact U.K. manufacturers of calculating and copying machines.

MEETINGS TO NOTE

THURSDAY, JAN. 4

A.S.E.E. (S. London Branch).—"Gyroscopes." W. S. Spencer. Cafe Royal, North End, Croydon, 8 p.m.

I.E.S. (Cardiff Centre).—"Lighting of Departmental Stores." A. W. Jervis. S. Wales Elect. Board, The Hayes, Cardiff, 5.45 p.m.

I.E.S. (Exeter Group).—"Floodlighting." R. S. Hazell. Agricultural Hse., Queen St., 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.W. Section).—"Marine Radar." G. W. L. Davis. Coll. of Technology, Manchester, 6.45 p.m.

FRIDAY, JAN. 5

MANCHESTER ASSOC. OF ENGRS.—"Automatic Welding." E. Hindson. Engrs. Club, Albert Sq., 6.45 p.m.

I.E.S. (Bath and Bristol Centre).—"Floodlighting." R. S. Hazell. S.W. Elect. Board Showrooms, Bath, 7 p.m.

I.E.S. (Birmingham Centre).—"Commercial Lighting of Big Stores and Shops," L. E. Gibbs. Imperial Hotel, Temple St., 6 p.m.

I.E.S. (Huddersfield Group).—"Lighting for High-Speed Photography." J. Hadland. Elect. Showrooms, Market St., 7.15 p.m.

I.E.E. (London).—"Mechanical Handling." Storey's Gate, St. James's Park, S.W.1.

I.E.E. (N.E. Students' Section).—"Research in Electrical Engineering." K. J. R. Wilkinson. King's College, Newcastle, 6.30 p.m.

SATURDAY, JAN. 6

BIRMINGHAM ELECTRIC CLUB.—Seventh Annual Children's Party. Grand Hotel from 3 to 6 p.m.

MONDAY, JAN. 8

I.E.E. (N.E. Centre).—"The Cost and Efficiency of Earthing on Low and Medium Voltage Overhead Line Systems." L. Gosland. Neville Hall, Westgate Rd., Newcastle, 6.15 p.m.

I.E.S. (Leeds Centre).—"Home Lighting." Miss M. Wardlow. 24 Aire St., Leeds 1, 7 p.m.

I.E.E. (Ipswich). —"Notes on Electrical Installations in large Chemical Factories." D. B. Hogg. Great White Horse Hotel, 6.30 p.m.

I.E.E. (Merseyside and N. Wales Centre).—"Determination of Time and Frequency." Humphrey M. Smith, Liverpool Royal Instn., Colquitt St., 6.30 p.m.

I.E.E. (S. Midland Supply and Utilisation Group).—Junior Members' Night. Imperial Hotel, Birmingham, 6 p.m.

I.E.E. (Western Centre).—"Oliver Heaviside." Prof. G. H. Rawcliffe. Technical College, Bath, 6 p.m.

TUESDAY, JAN. 9

I.E.S. (London). — "Brightness Engineering." W. Robinson. Lighting Service Bureau, Savoy Hill, W.C.2.

I.E.E. (E. Midland Centre).—"Personnel, their Selection, Training, Appraisement and Promotion." Col. C. E. Calveley. Electricity Showrooms, Derby, 6.30 p.m.

I.E.E. (N. Midland Centre).—"Continental Development of Single-Anode Mecrury-Arc-Rectifier Valves of High Power." H. von Bertele. 1 Whitehall Rd., Leeds, 6.30 p.m.

I.E.E. (N.W. Centre).—"Development and Design of High-Voltage Impulse Generators." F. S. Edwards, F. R. Perry and A. S. Husbands. Engrs. Club, Albert Sq., Manchester, 6.15 p.m.

PURCHASING OFFICERS' ASSOC. (S. Wales Branch).—"Rubber in Industry." King's Head Hotel, Newport, 7.30 p.m.

I.E.E. (N. Ireland Centre).—"Fifty Years' Development in Telephone Telegraph Transmission Relating to Work of Oliver Heaviside." W. B. Radley. Queen's University, Belfast, 6.45 p.m.

WEDNESDAY, JAN. 10

NORTHAMPTON ELECT. ASSOC.—"X-Rays in Industry." E. J. Grimwade, 7 p.m.

I.E.S. (Edinburgh Centre).—"Art and Science of Lighting in the Home." Miss M. D. Wardlow. Lighting and Cleansing Dept., High St., 7 p.m.

I.E.S. (Newcastle Centre).—Annual dinner at County Hotel, Neville St., 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (London Section).—A Symposium on Hearing Aids. E. R. Garnett Passe, E. Aspinall and J. P. Ashton. School of Hygiene and Tropical Medicine, Keppel St., W.C.1., 6.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.E. Section).—"Development of Small High-frequency Oscilloscope." H. A. Dell. Neville Hall, Westgate Rd., Newcastle, 6 p.m.

INCORP. PLANT ENGRS. (E. Midlands Branch).— "Electronics in Industry." K. Marwood. Welbeck Hotel, Nottingham, 7 p.m.

I.E.E. (London Radio Section).—"Use of Saturable Reactors as Discharge Devices for Pulse Generators." W. S. Melville. Savoy Place, W.C.2., 5.30 p.m.

I.E.E. (Scottish Centre).—"Continental Development of Single-Anode Mercury-Arc-Rectifier Valves of High Power." H. von Bertele. Heriot-Watt College, Edinburgh, 7 p.m.

I.E.E. (N.E. Scotland Sub-centre). —"Some Electrical Methods of Measuring Mechanical Quantities." Caledonian Hotel, Aberdeen, 7.30 p.m.

THURSDAY, JAN. 11

DUNFERMLINE ELECT. SOC. — "Overhead Transmission." A. Erskine. Unitas Hall, Queen Anne St., 7 p.m.

I.E.S. (Leicester Centre).—"Acrylic Plastics in Lighting." P. H. Collins. E. Midlands Elect. Board, Charles St., 6.30 p.m.

INSTN. OF WORKS MANAGERS (Wembley sub-branch).—"Production Control in a Light Engineering Factory." A. E. Barritt of Kodak, Ltd. "The Plough," Kenton Rd., Kenton, 12.30 p.m.

I.E.S. (Glasgow Centre).—"Lighting in the Home." Miss M. D. Wardlaw. 39 Elmbank Crescent, Glasgow C.2, 6 p.m.

I.E.S. (Manchester Centre).—"The Contractor Sheds Some Light." F. Ainscow. Manchester Town Hall, Extension 1, 6 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish Section). — "Frequency Modulation and F. M. Measuring Equipment." E. D. Hart and A. G. Wray. Instn. of Engrs. and Shipbuilders, Glasgow, 6.45 p.m.

INCORP. PLANT ENGRS. (E. Lancs. Branch).—"Electricity in Cotton." R. W. Cox. Engrs. Club, Albert Sq., Manchester, 7.15 p.m.

I.E.E. (London).—"Development and Design of High Voltage Impulse Generators." F. S. Edwards, F. R. Perry and A. S. Husbands. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N.E. Scotland Sub-centre). —"Some Electrical Methods of Measuring Mechanical Quantities." Royal Hotel, Union St., Dundee, 7 p.m.

I.E.E. (W. Wales Sub-centre).—Report on "Education and Training of Electrical Technicians." F. T. Chapman. Plaza Cinema, Swansea, 6 p.m.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Ashathene. 692,504. Class 6. 692,505. Class 9. Cables. Shardlow Electric Wires Ltd., 56 Moseley St., Manchester.

Cadet. 692,279. Class 11, Cooking apparatus. Simplex Electric Co., Ltd., Broadwell Rd., Oldbury, Nr. Birmingham.

Carefree. B691,777. Class 7. Washing, wringing, drying, and ironing machines. Wm. E. Cary Ltd., Manchester Spring Axle Works, Red Bank and Adeline St., Manchester 4.

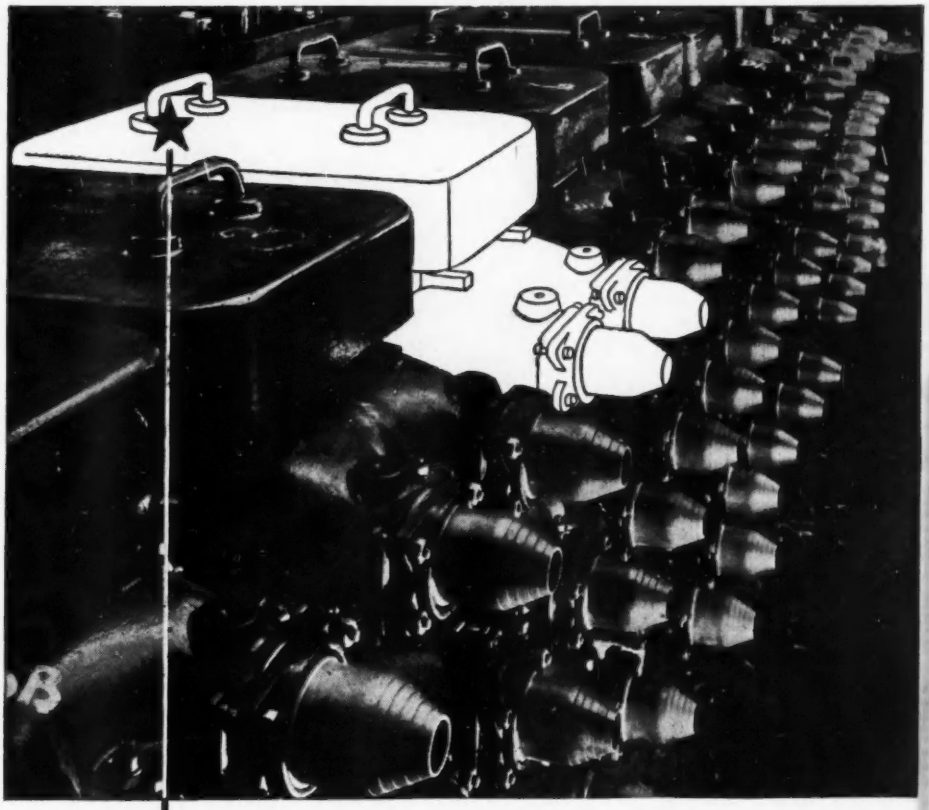
Cavalcade. 692,521. Class 9. Television apparatus and instruments. C. S. Gray, 25 Astons Rd., Moor Park, Herts.

Distran. 692,358. Class 9. Radio transmitting and receiving apparatus, etc. Decca Record Co., Ltd., 1-3 Brixton Rd., London S.W.9.

Hamilair. 691,224. Class 11. Electrical heating and ventilating apparatus. Hale, Hamilton and Co., Ltd., 107 Old Broad St., E.C.2.

Hivac. 685,454. Class 11. Electric lamps. Hivac Ltd., Greenhill Crescent, Harrow-on-the-Hill.

Mary Ann. 692,872. Class 7. Ironing, washing, wringing machines, combined washing and drying machines, machines for peeling and slicing vegetables, etc. Thorn Electrical Industries Ltd., 105/109 Judd St., London W.C.1.



Whether you want one-or hundreds

We can give prompt delivery of a wide range of HENLEY Underground Disconnecting Boxes with or without C.I. Pits. Cartridge Fuse-Links or Wedge type links can be fitted as required. Porcelain Insulators, coloured to distinguish the phases and neutrals, support the current carrying parts and increase leakage paths between phases. Brass Wiping Glands are clamped to machined faces on the box, ensuring perfect bonding between gland and box. Please write for details.

HENLEY

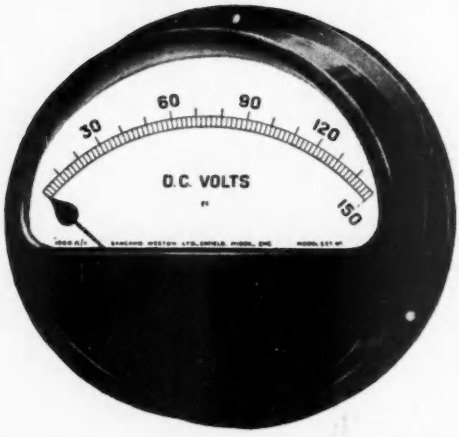
UNDERGROUND DISCONNECTING BOXES

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

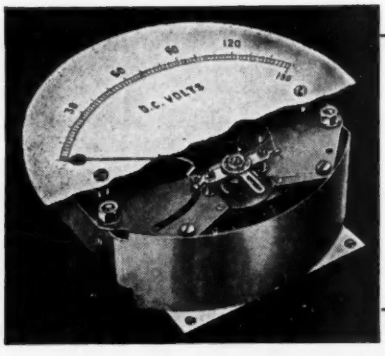
FEATURES OF WESTON SUPERIORITY

Weston

MOVING COIL SWITCHBOARD INSTRUMENTS



Combining the sensitivity of a laboratory instrument with the robust qualities of a switchboard pattern, this new series of 'Weston' permanent-magnet, moving coil instruments represents a great advance in design and technique. They incorporate thermocouples and rectifiers where necessary. Special features include efficient damping, the new standard 'Weston' patented spring-loaded jewel to protect the pivot, magnetic shielding and a high degree of accuracy. Mounted in attractive bakelite cases, flush fitting or projecting, the 6" easily read scale is printed in black on white enamel. All instruments conform to B.S.I. Spec. No. 89. Special enquiries will receive the personal attention of our Technical experts. The model S57 illustrated is supplied as a D.C. Microammeter, Milliammeter, Millivoltmeter, Ammeter and Voltmeter, all with a variety of ranges.



MAGNETIC SHIELDING. To prevent interference from external magnetic fields and to reduce those due to the instrument, it is magnetically shielded as shown. The high degree of accuracy of these instruments is in no small measure due to this 'Weston' design.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX.

Telephone: Enfield 3434 (6 lines) & 1242 (4 lines) - Telegrams: Sanwest, Enfield.

Branches: Glasgow, Newcastle-on-Tyne, Leeds, Manchester, Wolverhampton, Bristol, Southampton, Brighton, Liverpool, Nottingham.

120

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF BELFAST

CARBON DIOXIDE FIRE FIGHTING EQUIPMENT

TENDERS are invited for the supply, delivery, and erection at Mountpottinger Sub-Station, Thorndyke Street, Belfast, of CO_2 fire-fighting equipment for the protection of 33 kV switchgear.

Form of tender (No. N.958), conditions, specification, and drawings, in quadruplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas (cheques to be made payable to the Belfast Corporation Electricity Department), which deposit will be refunded provided a bona-fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at three guineas per set, which sum will not be returnable.

Each tender, in quadruplicate, in sealed envelope marked "Tender for CO_2 Fire Fighting Equipment, Mountpottinger Sub-Station," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, 2nd February, 1951.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
29th December, 1950. (H 269)

APPOINTMENTS VACANT

LONDON ELECTRICITY BOARD

ASSISTANT INSTALLATION SUPERVISOR

APPLICATIONS are invited for the above position at High Road, Ilford, Essex.

The successful applicant will be required to assist the Supervisor in the preparation of specifications and estimates, and in the supervision of all activities of the Electrical Contracting Section.

Pending grading of the post under the National Agreement of the appropriate negotiating body, the provisional salary will be fixed according to qualifications and experience up to a maximum of £490 per annum, inclusive.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned within seven days. Please enclose addressed foolscap envelope and quote Ref. EST/V/1022/T on envelope and all correspondence. (H 275)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at the Darwen Generating Station, Robin Bank, Darwen, Lancs.

The salary for this position, which is superannuable, will be £430/£472 per annum, in accordance with Grade 7, Class "A" of the Revised National Joint Board Agreement.

Candidates should preferably possess technical qualifications, and previous experience in a generating station is desirable.

Applications, stating age, qualifications and present position, together with full details of education and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than 13th January, 1951. (H 273)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

ASSISTANT MAINTENANCE ENGINEER (Mechanical) Little Barford Generating Station.

Applicants should have had engineering training, including manufacturing workshop experience, and be conversant with repairs and maintenance of a large Generating Station. Preference will be given to applicants who are associate members of a recognised engineering institution or hold similar qualifications.

Salary in accordance with the revised N.J.B. Schedule, Grade 8, Class "G," (£607 to £631 per annum).

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than 19th January, 1951. Envelopes should be endorsed "Assistant Maintenance Engineer (Mechanical)—Little Barford."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (H 270)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

SECOND ASSISTANT ENGINEER, Technical Department. Candidates should possess a degree or the Higher National Certificate in Electrical Engineering, and have had a wide experience in the installation and management of the types of protective gear, which are associated with the Authority's Transmission System and Generating Station. Some knowledge of such system calculations as appertain to the investigation of protective gear operation will be an advantage.

The selected candidate will normally be located at Divisional Headquarters, Kingston-upon-Thames, and will be required to supervise the work of engineering staff in the field, to direct the investigation of faults and to carry out any special investigations which may from time to time be required.

N.J.B. conditions of service and salary, Class "AX," Grade 11, commencing £752 plus L.A. Applications, on forms obtainable from Divisional Secretary, B.E.A., S.E. Division, Lower Ham Road, Kingston-upon-Thames, to be returned by January 18, 1951. (H 280)

BRITISH ELECTRICITY AUTHORITY

London Division

DEPUTY STATION SUPERINTENDENT
ISLINGTON GENERATING STATION

APPLICATIONS are invited for the above appointment.

Candidates should have received a sound technical training in electrical and mechanical engineering, followed by experience in the efficient operation and maintenance of generating station plant.

Salary and conditions of service will be in accordance with the revised N.J.B. Schedule, Class "D," Grade 3, commencing at £768 12s. 0d. p.a., inclusive of London Allowance.

This appointment will be superannuable under the terms of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, qualifications and experience, should be addressed to the Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, to be received within seven days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(H 274)

HIS MAJESTY'S COLONIAL SERVICE

NYASALAND

A VACANCY exists for a JUNIOR ELECTRICAL ENGINEER, Nyasaland, on a salary scale of £620 to £865, the point of entry being determined by war service and approved professional experience. Appointment will be on two years' probation for pensionable employment. If appointed on a salary less than £840, the officer would receive an outfit allowance of £30. A cost-of-living allowance is payable, varying from £30 to £20 in the case of a single officer to £120 to £107 in the case of a married officer with more than two children.

Free passages will be provided on appointment and on leave, for the officer and his wife, with assistance towards the passages of children up to the cost of one adult passage. Quarters are provided, if available, at a rent of 10 per cent. of full salary; and leave is granted at the rate of five days for each month of service in a tour of two to three years.

Candidates, between the ages of 23 and 27, should have the minimum qualification of Higher National Certificate in Electrical Engineering, and will be required to become Associate Members of the Institution of Electrical Engineers before confirmation in the Colonial Engineering Service at a later date. They should have experience in electricity supply with overhead distribution and, if possible, power stations, and be prepared to instruct African artisans.

Candidates should write to the Director of Recruitment, Sanctuary Buildings, Great Smith Street, London S.W.1, for further particulars and a form of application, stating briefly age, qualifications and experience, mentioning this paper and quoting reference No. 27326/43. (H 277)

HIS MAJESTY'S COLONIAL SERVICE

VACANCIES exist in the Department of Telecommunications, Federation of Malaya and Singapore, for ASSISTANT CONTROLLERS (Radio). Appointment will be on contract for three years in the incremental salary scale $650 to $1,015 (Malayan dollars) per month, including expatriation pay (equivalent to £910 to £1,421 per annum). The point of entry will depend on approved experience and war service. There is in addition a cost of living allowance of $150 to $375 per month (equivalent to £210 to £504 per annum).

Candidates must be British subjects, physically fit and between the ages of 23 and 35 years. They must possess City and Guilds Radio Communication (III) Final Certificate or have passed an equivalent Service examination, and have considerable experience of the installation and operation of radio equipment in a recognised organisation or the Forces, with a thorough knowledge of m.f., h.f. and v.h.f. transmitters and receivers, including Police v.h.f. mobile communication systems.

Free first-class passages for the officer, his wife and up to three children under 10 years of age are provided on appointment and once each way for each tour of service. Government quarters are provided, if available, at a nominal rent. On satisfactory completion of the contract a liberal gratuity will be paid and home leave granted on full pay at the rate of 4 days for each month of residential service.

Candidates should write at once to the Director of Recruitment (Colonial Service), Sanctuary Buildings, Great Smith Street, London, S.W.1, stating age, professional qualifications, brief details of their experience and quoting Ref. No. 27323/8. (H 246)

CITY OF WAKEFIELD

CITY ENGINEER'S DEPARTMENT
SENIOR TECHNICAL ASSISTANT
(PUBLIC LIGHTING) GRADE VI

APPLICATIONS are invited from suitably qualified Engineers for the appointment of Senior Technical Assistant (Public Lighting, etc.), Salary Grade A.P.T. VI (£595 to £660).

Applicants must have had experience of the preparation of street lighting schemes and of the maintenance of electric and gas installations, as well as the design and preparation of specifications for lighting of schools, public buildings and housing schemes. Experience in the design of heating and ventilating schemes will be an advantage.

The appointment will be subject to the Local Government Superannuation Act, 1937, and to the passing of a medical examination.

Candidates should state in writing whether they are to their knowledge related to any member or senior officer of the Corporation. Canvassing will disqualify.

Applications, endorsed "Senior Technical Assistant," stating age, qualifications, present and previous appointments, and details of experience, together with the names of two referees, should be sent to me not later than the 27th January, 1951.

W. S. DES FORGES,
Town Clerk.

Town Hall,
Wakefield,
22nd December, 1950. (H 262)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

Northmet Sub-Area 134/50

DISTRICT COMMERCIAL ASSISTANT, HERTFORD

Applicants must be of good address and have an all-round knowledge of installation work and domestic appliances, together with an aptitude for sales work. It would be an advantage if the applicant possesses the E.D.A. Salesmanship Diploma and the ability to plan and prepare quotations for installations, including water-heating installations.

The salary for the appointment will be in accordance with Grade 3 of the National Joint Council Agreement (£450 to £510 per annum), at a point dependant upon the applicant's ability and experience.

Applications should be addressed to The District Manager, Eastern Electricity Board, Bridgefoot, Ware, Herts.

Fens Sub-Area 135/50.

DEMONSTRATOR, ELY

Applicants, preferably holding the E.A.W. Certificate, should have had domestic science training, including electrical housecraft, and should be competent to plan and give cookery demonstrations, including lectures and advice to consumers on the utilisation of electrical appliances. Previous experience in an electricity service centre is desirable.

The salary will be in accordance with Grade 1 (£310 by £20 to £390) of the National Joint Council Agreement, dated March 23, 1950.

Applications should be addressed to The Manager, Cambridge District, Eastern Electricity Board, 4 Market Hill, Cambridge.

Both future salaries and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications in writing, stating age, education, qualifications, experience, details of present employment and salary, together with the names of two referees, should be addressed to the managers concerned so as to arrive not later than 14 days from the appearance of this notice. (H 251)

BRITISH BROADCASTING CORPORATION

B.B.C. invites applications for the post of ENGINEER in the House Engineer's Section of Building Department, to act as Assistant to the House Engineer and to supervise the maintenance of electrical and mechanical services at the Lime Grove Television Studios, London. Essential qualifications include a sound knowledge of, and practical experience with, steam boiler plants, heating installations and air-conditioning plants. Theoretical knowledge and practical experience in electrical and mechanical engineering are essential, and the successful applicant must be able to deal with the maintenance and repair of electric motors and generators, stationary oil engines and associated switchgear, a.c. and d.c. power installations, general lighting, battery-operated clock system, etc. Applicants must have had administrative experience, must possess the ability to control skilled and semi-skilled staff and be able to deal with routine records and with contractors' correspondence. Starting salary £655 p.a. (may be higher if qualifications and experience are exceptional) rising by annual increments on a five-year progression to £840 p.a. Admission to the established staff (contributory pension scheme) is subject to a two-year qualifying period. Applications stating age, details of past and present employment, to reach Engineering Establishment Officer, Broadcasting House, London W.1 within 7 days (H 228)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointments of JUNIOR ENGINEERS at the following power stations:

Clarence Dock Power Station, Liverpool. Salary Class "K," Grade 16, £436 £452.

Percival Lane Power Station, Runcorn. Salary Class "G," Grade 14, £412 £428.

Warrington Power Station. Salary Class "F," Grade 14, £392 £406.

Applicants should have gained the Higher National Certificate in Electrical Engineering and have served an apprenticeship with an electrical plant manufacturer. Experience in the installation and testing of protective and control gear will be an advantage. The appointments are superannuable under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and returned to him not later than Monday, January 15, 1951. (H 231)

EASTERN ELECTRICITY BOARD

APPOINTMENT OF ADMINISTRATIVE ASSISTANT IN THE LIAISON AND PERSONNEL OFFICER'S DEPARTMENT

APPLICATIONS are invited from suitably qualified persons for the position of Assistant in the Liaison and Personnel Officer's Department at Area Board Headquarters, Wherstead, Ipswich, to deal with the administration of schemes for the welfare of staff employed in all parts of the Board's area.

Applicants must have had a sound general education and should possess good administrative ability and a knowledge of office organisation. Experience of joint consultation work will be a qualification.

The salary will be in accordance with Grade 8 (Principal Assistants) of the N.J.C. Scales, commencing at £795 per annum and rising by annual increments of £35 to £900 per annum. The conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may have to undergo a medical examination.

Applications should be sent to the Liaison and Personnel Officer, Eastern Electricity Board, Wherstead, Ipswich, to arrive not later than Wednesday, January 15, 1951.

December 21, 1950. (H 250)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

STEAM TESTING DEPARTMENT
SECOND ASSISTANT ENGINEER

APPLICATIONS are invited for the appointment of Second Assistant Engineer in the Steam Testing Department with headquarters at Dunston Power Station.

Applicants should possess a degree in Engineering or equivalent qualifications, and have had experience in the carrying out and supervising of testing of Power Station Plant. They should also have a good knowledge of thermodynamics and be capable of presenting comprehensive reports assessing test results and data.

The salary for this appointment will be in accordance with Grade 2, Schedule C, of the National Joint Board Agreement, £752 to £938 per annum, and will commence at a point commensurate with qualifications and experience.

Superannuation will be in accordance with the British Electricity Authority and Area Boards' superannuation scheme.

Forms of application may be obtained from the Divisional Secretary (Establishments), British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne 1, to whom they should be returned to arrive not later than 24th January, 1951. (H 263)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited from suitably qualified and experienced persons for the position of SECOND ASSISTANT ENGINEER (Planning and Protection) in the Taunton Sub-Area with headquarters at Taunton. Commencing salary £851 per annum (Class "G," Grade 7, N.J.B. Agreement). The duties attached to this post include general planning work, preparation of advanced 33kV system improvement schemes and the specification of major 33kV substations; responsibility for routine testing of all switchgear and relays at bulk supply points; the examination of protective systems and testing of new h.v. cables and switchgear installations. The person appointed may be required to undertake standby duty, when necessary. Candidates should have had wide experience in these duties and be able to exercise supervision. Preference will be given to applicants who are Corporate or Associate Members of the Institution of Electrical Engineers.

Applications, stating age, present position and salary, full details of qualifications and experience, should reach the Sub-Area Manager, South Western Electricity Board, Electricity House, The Parade, Taunton, within ten days. (H 229)

LONDON COUNTY COUNCIL

ROYAL FESTIVAL HALL

APPLICATIONS are invited for appointment on a temporary basis in the first instance, to the position of HALL ENGINEER in the Royal Festival Hall. The person appointed will be responsible for the operation and maintenance of all engineering equipment, i.e. electric lighting, power and lifts, automatically controlled heating and air conditioning plants, hot and cold water supplies, fire equipment, sound amplification and other ancillary services. Experience of engineering work at theatres, hotels or large halls an advantage. Salary £700-£840 according to qualifications and experience.

If the person appointed is required to reside in the Hall accommodation will be provided at an agreed rental. Applications to General Manager, Royal Festival Hall, County Hall, S.E.1, not later than January 27, 1951. (1685) (H 232)

LONDON ELECTRICITY BOARD

ENGINEERS (CONSTRUCTION)

APPLICATIONS are invited for the following positions in the Constructional Branch of the Chief Engineer's Department in Central London:

(a) Engineer (Construction) to supervise erection at various bulk supply substation sites within the Board's area, of heavy electrical plant, including transformers and switchgear, at working pressures of up to 66 kV, together with all auxiliary equipment. Applicants must have had previous experience of this work both in the factory and in the field. Corporate membership of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers would be an advantage.

(b) Engineer (Construction) to supervise the laying, jointing and testing of underground cables, within the Board's area, for working pressures up to 66 kV. Previous experience of such work and of the handling and checking of cable contracts is essential. Corporate membership of the Institution of Electrical Engineers will be an advantage.

Pending grading of the posts under the revised agreement of the National Joint Board, the provisional salaries will be from £650 per annum inclusive in each case, dependent upon qualifications and experience.

Application forms obtainable from the Establishments Office, 46 New Broad Street, E.C.2, on receipt of addressed foolscap envelope to be returned duly completed by January 29, 1951. Please quote Ref. EST/V/1094/T on envelope and all correspondence. (H 185)

LONDON ELECTRICITY BOARD

DISTRICT COMMERCIAL OFFICER

APPLICATIONS are invited for the above appointment at Ilford.

The person appointed will be responsible for the commercial organisation and development of the District, and applicants should have had experience in commercial development of electricity supply; control of Service Centres, sales and staff; administration and operation of hire and hire-purchase schemes; control of an electrical contracting and maintenance department and staff. Preference will be given to Corporate Members of the Institution of Electrical Engineers or applicants possessing similar qualifications.

The provisional salary will be within the range £800 to £850 per annum, subject to adjustment through the appropriate negotiating machinery.

Application forms, obtainable on receipt of addressed foolscap envelope, from Establishments Officer, 46 New Broad Street, E.C.2, to be returned duly completed within seven days. Please quote Ref. EST/V/1113/T on envelope and all correspondence. (H 260)

MIDLANDS ELECTRICITY BOARD

North Staffs Sub-Area

APPOINTMENT OF JUNIOR ENGINEER

APPLICATIONS are invited for the above appointment at the headquarters of the above Sub-Area, 31 Kingsway, Stoke-on-Trent.

Applicants should have had some experience in distribution work and will be required to undertake duties in connection with technical records and calculations. Appropriate technical qualifications will be considered an advantage.

Conditions of service will be in accordance with the National Joint Board Agreement and the salary will be Class "J," Grade 15, £435 per annum.

Applications in writing, stating age, qualifications, experience, and present salary, should be forwarded within seven days to Mr. H. A. P. Caddell, Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(H 249)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

THIRD ASSISTANT ENGINEER (METERING). Applicants should have had good general and technical education, hold the Higher National Certificate in Electrical Engineering, and have had experience in the manufacture and testing of impulse summation metering, relays, instruments, etc. Duties will include commissioning and maintenance of power station and sub-station h.t. metering equipment and electrical instruments, electrical measurements for turbo-alternator efficiency tests, current and voltage transformer testing, and electrical measurements of all kinds. A knowledge of statistical and records procedure will be an advantage.

N.J.B. conditions and salary commencing in Class "AX," Grade 5, £579 to £710 p.a. plus London allowance.

Applications, on forms obtainable from Divisional Secretary, B.E.A., S.E. Division, Lower Ham Road, Kingston-upon-Thames, to be returned by January 18, 1951. (H 266)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the positions as JUNIOR ENGINEERS at:—

(a) *Kearsley Generating Station, Stoneclough, Near Manchester*

The commencing salary will be £375 per annum, in accordance with Grade 19, Class "K" of the Revised N.J.B. Agreement, rising to £478 per annum, Grade 15, Class "K."

(b) *Agecroft (H.P.) Generating Station, Agecroft Road, Pendlebury, Lancs.*

The commencing salary will be £375 per annum, in accordance with Grade 16, Class "G" of the Revised N.J.B. Agreement, rising to £428 per annum, Grade 14, Class "G."

Candidates should preferably possess technical qualifications, and previous experience in a large modern generating station is desirable.

These appointments will be superannuable.

Applications, stating age, present position, and giving full details of qualifications, education and experience, should be received by the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than 13th January, 1951. (H 278)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

APPOINTMENT OF INSTALLATION INSPECTOR "D" DISTRICT, MACCLESFIELD

APPLICATIONS are invited for the appointment of Installation Inspector at Macclesfield.

Applicants must have had considerable experience in all classes of electrical installation work and preferably the testing of domestic, commercial and industrial electrical installations. Technical experience up to the Ordinary National Certificate Standard will be an advantage.

The rate of pay and conditions of service will be in accordance with the National Joint Industrial Council Agreement for the Electricity Supply Industry, the present rate of pay being 37.25d. per hour (£6 16s. 7d.) for a 44 hour, 5-day week.

Applications, which should give details of age, training, experience, present position and present wage, should be received by J. Harwood Lumsden, M.I.Mech.E., A.M.I.E.E., Sub-Area Manager, No. 7 Sub-Area, The North Western Electricity Board, Electricity Offices, Chapel Street, Hazel Grove, Cheshire, not later than January 6, 1951. (H 230)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at Oxford Generating Station.

Applicants should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience of an electricity generating station, and preferably have had manufacturing works experience.

The salary will be in accordance with Grade 7, Class "D" of the National Joint Board's Schedule, at present £563 to £573 per annum.

Forms of application may be obtained from the undersigned and should be returned not later than 19th January, 1951.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street,
Portsmouth.
29th December, 1950. (H 276)

LONDON ELECTRICITY BOARD

ENGINEERING ASSISTANTS

APPLICATIONS are invited for the above positions at the London Airport site of the Contracting Section.

Applicants must have had a thorough theoretical and practical training, and experience in the installation and maintenance of underground and overhead e.h.v., h.v. and m.v. systems essential. Previous experience of contract work will be an advantage.

The commencing salary will be £600 per annum inclusive.

Application forms, obtainable on receipt of addressed foolscap envelope, from Establishments Officer, 46 New Broad Street, E.C.2, to be returned duly completed within seven days. Please quote Ref. EST/V/1078/T on envelope and all correspondence. (H 261)

A FEW attractive vacancies for DRAUGHTSMEN exist at the Liverpool works of the English Electric Co. Ltd. The work is of an electro-mechanical nature, but any draughtsmen with experience in the design and detailing of mechanisms or welded fabrications, or, in fact, any kind of medium mechanical equipment will be considered. Excellent opportunities for advancement in this interesting field.—Please write, giving full details and quoting Ref. 135B, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (H 239)

ELECTRICAL/MECHANICAL INSPECTOR

An Electrical/Mechanical Inspector is required by a major British Oil Company for service in the Middle East. Applicants must have wide experience covering maintenance and inspection of installed plant associated with modern large generating stations with voltage range of 33 kV to 440 volts. Knowledge of flameproof switchgear an advantage. Possession of H.N.C. essential and qualifications up to A.M.I.E.E. desirable. Age limit 37 years. Attractive salary plus generous allowance in local currency designed to assist substantially in meeting cost of living, free passages, kit allowance, free medical attention, good leave arrangement, pension scheme.

Write, giving personal particulars, and details of qualifications and experience, quoting Dept. F.7, to Box 3291 at 191 Gresham House, London, E.C.2. (H 270p)

A CONTRACT ENGINEER is required for a permanent post in the Union of South Africa. Applicants should have had experience in the laying and jointing of power cables up to 33 kV and also of the installation of concrete and wood pole overhead lines. A single man is preferred and the holding of Ordinary and Higher National Certificates would be an advantage.—Please apply in writing to the Contract Manager, W. T. Henley's Telegraph Works Co. Ltd., 51-53 Hatton Garden, London E.C.1. (H 244)

A RECENTLY opened drawing office at Bradford requires additional DRAUGHTSMEN for work on electrical control gear. Draughtsmen with previous electrical or mechanical experience are invited to apply for these positions which are permanent, progressive and pensionable.—Please write, quoting ref. 138B, and giving full particulars, to Central Personnel Services, English Electric Co., Ltd., 24-30 Gillingham Street, London S.W.1. (H 213)

APPLICATIONS are invited for a number of vacancies for ELECTRICAL ENGINEERING SENIOR DRAUGHTSMEN for the installation of electrical equipment in large civil and military aircraft. Some knowledge of electronic equipment is desirable and possession of O.N.C. or H.N.C. (Elect.) preferable. The vacancies are for Cricklewood and Radlett (Herts) drawing offices. Further vacancies exist at Cricklewood only for Junior Electrical Engineering Draughtsmen for detailing the above work. The positions offer excellent opportunities for advancement to keen men.—Write, stating age and full details of experience and qualifications, to Staff Officer, Handley Page, Ltd., Cricklewood, London N.W.2. (H 177)

URGENTLY REQUIRED

POWER STATION CHARGE ENGINEERS

by major oil company for service in the Middle East. Applicants must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern Steam Power Stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 8a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum PLUS an allowance in the local currency which is liable to variation but which at the present time is equal to £1,400 per annum. Free passages out and home, free medical attention, kit allowance, good leave arrangements, excellent Pension Scheme. Write, giving age, personal particulars, and full details of qualifications and experience, quoting Dept. F.189, to

Box No. 2550 at 191 Gresham House, E.C.2

(E 284p)

APPLICANTS are invited for the post of RESIDENT ENGINEER to take charge of Contracts for Erection and Commissioning of hydro-electrical equipment in Portugal. Only engineers with substantial experience of large-scale overseas responsibility for this class of work will be considered. Contracts in Portugal will be of some years' duration, but on completion continued similar employment will probably be available at home or overseas.—Apply, giving full details and quoting Ref. 838, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (H 238)

CABLE FOREMAN required immediately, London area, for 33 kV cable laying, and take charge gang. Must have wide experience.—State age, salary expected, details of experience and references, to Employment and Welfare Manager, Johnson and Phillips, Ltd., Charlton, S.E.7. (H 183)

CHIEF TRANSFORMER DESIGNER. Experienced in design of units of 10-15 MVA up to 132 kV, and with on-load tap changing and impulse work. Salary in accordance with qualifications and experience.—Apply, Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. (H 254)

DRAUGHTSMAN required by Scottish firm, experienced in sagging overhead lines.—Reply, stating age, experience and salary required, to Box No. 2049, Electrical Times. (H 267)

DRAUGHTSMEN. Britain's leading design consultants and contractors require urgently Senior Switchgear Draughtsmen, also Juniors to train as Switchgear Draughtsmen. Good salaries and prospects of advancement for suitable applicants. Pension scheme.—Write in confidence, quoting reference E.T., to John A. Smith Ltd., 24 Lichfield Street, Wolverhampton. (H 201)

DRAUGHTSMEN with experience on all sizes of power transformers required by company in S.W. London. Pension scheme in operation and five-day week. State full details, past experience, technical education and salary required.—Box No. 2031, Electrical Times. (H 199)

ELECTRICAL ENGINEER of A.M.I.E.E. standard preferably single, required by a European firm of Electrical Agents and Contractors in West Africa. B.I.C.C. or B.T.H. trained man preferred. Terms £1,200 p.a. plus percentage of profits on contracts; 15 months' coast service, two months' home service, one month's leave.—Apply: R. L. T. Jones, 402 Upper Richmond Road, Putney, S.W.15. Telephone: Putney 7423. (H 208)

ELECTRICAL ENGINEERS required by major British oil company for several months' training in U.K. in power-station work for eventual service in the Middle East. Minimum qualifications: Higher National Certificate in Electrical Engineering, with one year's industrial experience. A salary is paid while in U.K., together with contribution to cost of living if away from home. Overseas posts offered to successful trainees will carry attractive salary plus a generous allowance in the local currency, free passages out and home, free medical attention, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and career to date, quoting Department F.196, to Box No. 2946, at 191 Gresham House, E.C.2. (G 93)

ELECTRICAL ENGINEER with experience of design of control gear for industrial and traction motors wanted for Sales Office of Resistor Manufacturer near London to handle enquiries and application design.—Please state age, salary and experience to Box No. 2041, Electrical Times. (H 226)

ELECTRICAL ENGINEER (Junior) for works engineers department, with experience in the preparation of schemes for lighting and installation of general electrical equipment. Higher National Certificate desirable. Salary according to age and experience.—Apply, Box No. 2043 Electrical Times. (H 247)

ELECTRICAL ENGINEER, qualified, required as outside representative for Glasgow branch of well-known organisation. Knowledge of installations and electrical equipment for factories and industrial undertakings essential. Preference given to engineer with good connections in Glasgow and West of Scotland areas. Excellent opportunities of promotion in expanding branch.—Apply, in confidence, stating age, technical qualifications and apprenticeship, to Box No. 2045, Electrical Times. (H 257)

ELECTRICAL ENGINEERING DRAUGHTSMAN required for Works with M.D. of 4,000 kVA, experienced in sub-station layouts and works electrical services (a.c. and d.c.) including lighting. Some mechanical experience would be an advantage. Five-day week and pension fund.—Apply, stating age, qualifications, details of experience and salary expected, to The Avon India Rubber Co. Ltd., Melksham, Wilts. (H 222)

EXPERIENCED SENIOR DRAUGHTSMEN urgently required by a well-known manufacturer for employment in the Midland and London areas. Excellent opportunities for men experienced in switchgear layout and design. These are senior vacancies carrying salaries of up to £600 per annum, and good possibilities exist for the provision of accommodation in the Midland area for suitable married applicants.—Write, giving full details, quoting Ref. ADA, to Box No. 2037, Electrical Times. (H 224)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ELECTRICAL INSTRUCTOR, preferably about 40 years of age, required by leading correspondence school in Central London area. Five-day week. Good prospects.—Apply in writing, with full details of age, practical experience, and technical qualifications, to Box No. C. 167, Willings, 362 Grays Inn Road, W.C.1. (H 261)

EXPERIENCED ELECTRICAL FITTER, fully conversant with reconditioning of all types of electrical motors and starters. Five-day week. Good rates.—Write only to John Phillips and Co. (Electrics) Ltd., India Pavilion, Exhibition Grounds, Wembley, Middx. (H 235)

FIRST-CLASS overhead LINESMEN required for contracts in South-west Scotland Board Area.—Apply: Messrs. James Kilpatrick and Son Ltd., Kelvin House, Paisley. (H 233)

JAS. WILLIAMSON & SON, LTD. (manufacturers of linoleum, leathercloth, coated and proofed fabrics, etc.), require a POWER ENGINEER to take charge of the generation, distribution and utilisation of steam and electricity, and to be directly responsible to the Chief Engineer. Candidates should be qualified Electrical Engineers, with sound experience in the operation and maintenance of high-pressure steam plant, and in the design, installation and maintenance of steam and electricity factory services. Applications, giving details of age, education, training, experience, positions held and salary required, should be made by letter to the Personnel Manager, Lune Mills, Lancaster. (H 271)

JUNIOR & SENIOR ELECTRICAL ENGINEERS required. O.N.C. standard. Some knowledge motor control equipment desirable. Progressive positions. Salary in accordance with age and experience.—Write, giving details, to Personnel Officer, Dewhurst and Partner Ltd., Inverness Works, Hounslow, Middlesex. (H 237)

JUNIOR TECHNICAL CLERK with electrical engineering background required for Contracts Department. Pension scheme. Canteen facilities. Salary in accordance with age and experience.—Write, giving details, to Personnel Officer, Dewhurst and Partner Ltd., Inverness Works, Hounslow, Middlesex. (H 236)

PRINCESS TSAHAI MEMORIAL HOSPITAL, ADDIS ABABA, ETHIOPIA. ELECTRICAL ENGINEER required to install and supervise electrical equipment. Contract for one year, renewable by mutual agreement. Salary 30% above current rate in Britain. Free transport to Ethiopia. Furnished modern housing accommodation. Excellent climate above malaria level. (H 245)

SALES REPRESENTATIVES (four) (a) Yorkshire, (b) Midlands, (c) South Wales, (d) South Coast, for well-known fluorescent cold cathode light fittings manufacturers. Progressive position for keen and energetic man with proved qualifications and connections.—Applications, stating age, experience, etc., will be treated in strict confidence, and should be addressed to Micramatic, Ltd., Wootton Mount, Bournemouth. (H 252)

SENIOR ELECTRICAL ENGINEER required for duty in Middle East areas of large oil company. Honours degree and/or A.M.I.E.E. qualification, with administrative experience and considerable practice in the layout, operation, and maintenance of h.t. and l.t. systems for generation to end use. Desirable age limit, 40. Salary (incremental) from £1,300, plus substantial allowances; free furnished quarters, messing or allowances in lieu. Biennial (paid) home leave. Married applicants must be prepared to serve single for first two to three years.—Write in full, quoting No. 31, to Box No. 3881, c/o Charles Barker and Sons, Ltd., 31 Budge Row, London E.C.4. (H 260)

SHOWROOM SALES. Electrical contractors with large modern showrooms require staff, male or female, fully experienced in electrical retail trade and knowledge of electrical appliances and fittings. Capable of displaying apparatus and window dressing. Excellent salary and good prospects to suitable applicant.—Reply, with all details, age, etc., to J. W. Russell Ltd., 18 Queens Road, Watford. (H 234)

THE STEEL COMPANY OF WALES LTD. have a vacancy for an ELECTRICAL ENGINEER to take charge of the Electrical Engineering Department at their Abbey Works. The successful applicant, who will be responsible to the Chief Electrical Engineer, will be required to co-ordinate the electrical work of all departments at Abbey Works.

Applicants should possess an Engineering Degree and/or Associate Membership of Institute of Electrical Engineers, together with extensive maintenance experience, preferably in a steelworks.

Applications, giving full particulars of training and experience, should be made to The Personnel Superintendent, P.O. Box No. 9, Port Talbot, Glam. (H 242)

SURVEYORS, experienced in the surveying and profiling of wood pole transmission and distribution lines; must hold current driving licence.—Write, giving age and full details of experience, to Box No. 2035, Electrical Times. (H 223)

TEST ROOM require experienced man with some electrical training for Rotating Electrical Machines up to 6 kW; large variety of designs. South-east London.—Box No. 2039, Electrical Times. (H 225)

TRANSFORMER DESIGNERS. Senior, experienced in design of units 10-15 MVA, with experience of on-load tap changing gear and preferably with some experience of impulse work on such units. Also Junior, with some experience. Salaries in accordance with qualifications and experience.—Apply, Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. (H 253)

TRANSFORMER DRAUGHTSMEN required by Hackbridge and Hewittic Electric Co., Ltd., at Walton-on-Thames, Surrey, one having experience on transformers up to 2,000 kVA and one having experience up to 100,000 kVA. Pension scheme. Five day week.—Write, giving age, experience and salary required, to Chief Draughtsman (Transformers). (H 200)

APPOINTMENTS FILLED

APPLICANTS for the position of ASSISTANT SECRETARY, which was advertised recently under Box No. 1831, are hereby notified that the vacancy has now been suitably filled.

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO. LTD., Haddington Street, Hove (Tel. 32986), electrical engineers and winding specialists. Distance no object. (F 739)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (H 268)

10/6 VAC. fields rewound; 19/6 vac. armatures rewound; 45/- complete rewind and overhaul vac. motors (3 to 7 days' service). Commutators and bearings extra. Also portable tools, etc. All motors from 1/20th to 200 h.p. rewound and reconditioned by J.B. Electric Ltd., 199 Manchester Road, Broadheath, Altrincham, Cheshire. (Tel.: Altrincham 2146.) (H 219)

WANTED

A.C./D.C. MOTORS, STARTERS, complete changeover installation, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

RECTIFIER, 1,000 amp. 4·7 V output; also air compressor, 5 cu. ft. per min.—4 Stratton Gardens, Luton. (H 258)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London, S.W.1. Phone: WHItehall 9621/2/3. (A 3)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Watertube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London, N.1. (A 13)

FOR SALE

AUCTIONS

By Order of the Minister of Supply.

G R

Auction Sale at
NO. 14 M.U., R.A.F., CARLISLE, NO. 7 SITE,
BLACKWOOD, LONGTOWN
(9 miles north of Carlisle),
FRIDAY, JANUARY 12
10.30 a.m.

ELECTRICAL AND INDUSTRIAL MACHINERY AND SUNDRIES

Including Generating Sets, Alternators, Boards and Panels, Motors, Starters, Compressors, Testers, Pumps, Receivers, Amplifiers, Lamps, Insulators, Clocks, Watches, Binoculars, 16 mm Projectors, Nozzles, Tanks, Lifting Tackle, Cables, Covers, etc.

Viewing Thursday, January 11, 9 to 4.30 p.m., and on sale morning, 9 to 10.30 a.m. Catalogue, 6d., from the Auctioneers:

HARRISON & HETHERINGTON, LTD.
CARLISLE.
Telephone 1792/3. Telegrams: "Sales"
(H 248)

GENERATING PLANT

ALLEN GENERATOR for sale, 125 kW, 250 V, d.c., 500 amps., driven by 200 h.p. vertical diesel engine, compressed air starting with compressor and slate panel, switchboard connections, tank. Inspect at works, West England.—F. J. Edwards Ltd., 359 Euston Road, London, N.W.1. (H 240)

GENERATOR FOR SALE, 220 V d.c., 130 amps., with control panel. Driven by Tangye 34 b.p.h. single-cylinder horizontal diesel engine. Inspection at works in West England.—F. J. Edwards Ltd., 359 Euston Road, London N.W.1. (H 241)

MOTOR GENERATING SETS. Built to customers' requirements of new and used plant. Many in stock at Wembley, inspection invited. Please send us your inquiries. We can help you to save time. Over a THOUSAND MACHINES ALWAYS IN STOCK.—Dynamo and Motor Repairs Ltd., Wembley Park, Middlesex. Telephone: Wembley 3121 (4 lines). Also at Phoenix Works, Belgrave Terrace, Soho Road, Birmingham. Telephone: Northern 0898. (A 2)

44 kVA GENERATING SET, 400 V, 3 ph, by Bruce Peebles, driven by two Leyland 6 cyl. 100 h.p. Diesels which run separately, one as standby, switch, meter panel, battery starting, never used. Brand new condition, minor completion needed. Room wanted; first reasonable offer.—F. W. Frazer, St. Albans Rd., Cheam, Surrey, Fairlands 7880. (H 243)

GENERATING SET

Two Screen Protected Direct Current Horizontal Spindle continuously rated GENERATORS, each 10 kW 110 V, as a compound wound machine, 10 kW 145 V as a shunt machine, speed 1,000 r.p.m. Provided with two end bracket-type grease lubricated ball and/or Roller bearings, terminal box for plain cable and free shaft extension, one 3-panel open flat back type SWITCHBOARD, two automatic starters, driven by two McLAREN RICARDO Diesel oil engines, type L.M.R. 2-cylinder, Nos. 30150 A and B, each complete with flywheel and guard, governor, water circulating pump, fuel filter, radiator with fan, and guard. Lubrication oil cooler mounted on radiator, lubrication oil filter, exhaust manifold silencer, exhaust pipe, air cleaner.

This equipment is new and unused, and was purchased in June, 1946, for the sum of £1,460, and has been carefully stored since its purchase, and can be inspected at Tallington, near Stamford, Lincs. Offers for the equipment should be made to

DOW-MAC (PLANT & TRANSPORT) LTD.
TALLINGTON, STAMFORD, LINCS.
Telephone: Peterborough 4501. (H 256p)

DOMESTIC APPLIANCES

"MORAHEAT" IMMERSION HEATERS

16" to 42" with Satchwell Thermostat, all voltages and intermediate loadings, fully guaranteed, no P.T.

ATTRACTIVE TRADE TERMS

Apply Agent:

W. TYLER, 20 Finemore Road, Little Bromwich, Birmingham 9. (G 817p)

IMMERSION HEATERS, Grubb 4 kW. No purchase tax. All lengths, 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed and immediate delivery. Write for illustrated brochure, latest lists and trade terms to distributors.—John Owner and Co., Ltd., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

CABLES & WIRE

TOUGH RUBBER CABLE available, all sizes and types; non-standard lengths (25 yds to 50 yds). Special prices quoted for regular buyer. Must be a user. Guaranteed strictly to BSS.7.—Box No. 1987, Electrical Times. (H 65)

LIGHTING EQUIPMENT

ELECTRICAL industries greatest value: 5 ft V-type FLUORESCENT FITTINGS with built-in control gear. £2 19s. 6d. complete, less tubes. Send 1d. stamp for lists.—Northern Industries, Snow Hill, Manchester 4. (D 50)

PURLEY CHOKES AND BALLASTS. Our 80-w. Tapped h.p.f. Ballast, with Starter Switch-holder incorporated, is proving itself the most popular unit. Suitable for most fittings, 57/6 each, subject.—F. W. Blanshard, Ltd. (Dept. ET), Purley, Surrey. Uplands 4618/9. (E 343)

METERS

A.C./D.C. SLOTMETERS (prepayment meters), all types and sizes. We supply Electricity Boards and Govt. Depts. Billiard Switches and Time Switches from stock. If you need reliable instruments write to: Brent Electrical Co., 6 Holmdale Gardens, Hendon, London N.W.4. (A 15)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

SWITCHGEAR

MERCURY SWITCHES are made by Hall Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: Bow 7221. (C 175)

TRANSFORMERS & CONVERTORS

100 NEW low voltage TRANSFORMERS for sale Made by G.E.C. Primary tapped every 10 volts from 200/250 V. Secondary 30 V 1:1 kVA. These transformers should be suitable for the manufacture of incubators, brooders, soil warming outfits, portable welding plants, etc. Further details and prices on application.—Box No. 2047, Electrical Times. (H 259)

MOTORS & STARTERS

A.A. ELECTRICAL CO.—FOR A.C./D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. Edgware 8631/4. (A 476)

ELECTRIC MOTORS, GENERATORS, TRANSFORMERS A.C. & D.C.

STARTERS, SLIP RING & D.C., SEMI-AUTOMATIC

Any voltage, new, short delivery, all types of revolving electrical power.

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London N.W.9. Telephone: COLindale 4621/2. (D 17p)

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7232. (A 12)

A.C. and D.C. MOTORS, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). (A 10)

FOR ELECTRIC MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (C 296)

UNCLASSIFIED

BRITISH ELECTRICITY AUTHORITY

North Western Division

TENDERS are invited for the purchase, dismantling and removal of the following redundant plant situated at Wigan Generating Station, Bradford Place, Wigan:—

(1) Steel chimney on brickwork base, together with overhead flues.

(2) Two six-drum John Thompson underfeed stoker boilers installed in 1919, capacity 25 k.lb./hr. 200 p.s.i., 550° F., ash hoppers attached to boilers, together with cast iron economisers, with exception of main structure. Boilers are of scrap value only.

Specification and form of tender can be obtained from the undersigned.

The Authority does not bind itself to accept the highest or any offer.

Tenders to be received not later than Monday, January 22, 1951.

P. H. FLATT,
Divisional Secretary.

British Electricity House,
Wilmslow Road,
Manchester, 20. (H 227)

BUSINESSES FOR SALE

FOR SALE BY PRIVATE TREATY

The Premises, Plant, Stock, and Goodwill of a well-known Firm of Electrical Engineers, specialising in service to the motor trade, but capable of expansion in manufacturing and contracting. Valuable freehold workshop and garage premises in Central London, within easy reach City and West End, well equipped with modern machine tools and plant. Substantial turnover. Vacant possession of whole on completion. Principals or their solicitors are invited to write for particulars, in confidence to Alfred Savill and Sons, 51a Lincoln's Inn Fields, London W.C.2. (Tel.: Hol. 8741-7). (H 279p)

MISCELLANEOUS

CITY AND GUILDS (Electrical, etc.) on "No pass—No Fee" terms. Over 95% successes. For full details of modern courses in all branches of Electrical Technology send for our 176-page handbook, FREE and post free. B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (D 244)

RICHARDS AND PARTNERS, associated with George Offord and Co., Auctioneers and Valuers of PLANT AND MACHINERY AND INDUSTRIAL PROPERTY, Granville House, Arundel Street, London W.C.2. Tel.: TEMple Bar 7471. (A 23)

E
M
I

FREE TO ENGINEERS. Brochure giving details of courses in Electrical Engineering and Electronics, covering A.M.Brit.I.R.E., City and Guilds, etc. We are the only Postal Training College operated and backed by an Industrial Organisation. Moderate fees. Facilities for easy payment. **E.M.I. INSTITUTES (associate of H.M.V.) Dept. E.T.9, 10 Pembridge Square, London W.2. Bayswater 5131/2.** (H 255p)

INDEX TO ADVERTISERS

Aidas Electric, Ltd. 20
Arora Co. 12
Ash & Lacy, Ltd. 68

Belling & Co., Ltd. 6
Best Products Ltd. 70
British Insulated Callender's Cables, Ltd. 11, 22
British Rototherm Co., Ltd. ... 4
British Thomson-Houston Co., Ltd. 26, 65
Brook Motors, Ltd. 53
Burco, Ltd. 5
B.V.C. Industrial Constructions, Ltd. 15

Cable Makers Association ... 14
Carter & Co. (Nelson) Ltd. ... 72
Cole, E.K., Ltd. 30
Columbus, Ltd. 55
Connollys (Blackley) Ltd. ... 17
Copper Development Association 8
Coughtrie, J. & G., Ltd.... ... 23
Crane, Walter 70
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. 2, 57

Daleman, Richard, Ltd. 72
Dewrance & Co., Ltd. 18
Dorman & Smith, Ltd. 66

Eagle Engineering Co., Ltd. ... 66
East London Mica Works ... 60
Edison Swan Electric Co., Ltd. ... 19
Edwards, F. J., Ltd. 68
Eeto Insulations 70
Ekco-Ensign Electric Ltd. ... 59
Electrical Contractors Association 56
Electrical Times 72
Enfield Cables, Ltd. 21
English Electric Co., Ltd. 25, 61

Ferguson, Pailin Ltd. 71
Ferranti, Ltd. 1
Fibreglass, Ltd. 73
Fluxite, Ltd. 58

G. W. B. Electric Furnaces Ltd.... 50
General Electric Co., Ltd. 29, 40, 57
Green, E. & Son, Ltd. 13
Grimmer, W. H. 70
Grubb Engineering Co., Ltd. ... 68

Hardy & Padmore, Ltd.... ... 60
Henley's W. T. Telegraph Works Co., Ltd. 41, 64
Higgs Motors, Ltd. 10
Horstmann Gear Co., Ltd. ... 24
Howells (Electric Motors) Ltd.... 30

Johnson & Phillips, Ltd.... 31, 63

Kaye, E. & E., Ltd. 56

Londex, Ltd. 72
Lyons, Claude, Ltd. 7

Manganese Bronze & Brass Co., Ltd. 51
Mather & Platt, Ltd. 12
Metropolitan Vickers Electrical Co., Ltd. 9
Metway Electrical Industries Ltd. 58
Mosses & Mitchell, Ltd. ... 54

New Era Industries (Tottenham) Ltd. 16
Nife Batteries, Ltd. 3

Parmiter, Hope & Sugden, Ltd. 75
Permaheat, Ltd. 62
Philips Electrical, Ltd. 35
Pitman, Sir Isaac & Sons, Ltd. ... 58

Radiovisor Parent, Ltd. 62
Reels, Ltd. 4
Reyrolle, A. & Co., Ltd. ... 28

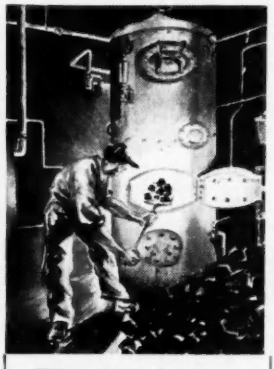
Sanders, William & Co. (Wednesbury), Ltd. 54
Sangamo Weston, Ltd. 42
Senior Economisers, Ltd. ... 74
Serck Tubes, Ltd. 64
Siemens Electric Lamps & Supplies Ltd. 32
Simon-Carves, Ltd. 33
Simplex Electric Co., Ltd. ... 27
Smith, Herman, Ltd. 24
Smith Meters, Ltd. 76
Southern Central Heating Co. ... 68
South Wales Switchgear, Ltd. ... 37
Standard Telephones & Cables, Ltd. 69
Steatite & Porcelain Products, Ltd. 16

T.M.C.-Harwell (Sales) Ltd. ... 36
Tudor Accumulator Co., Ltd. ... 52

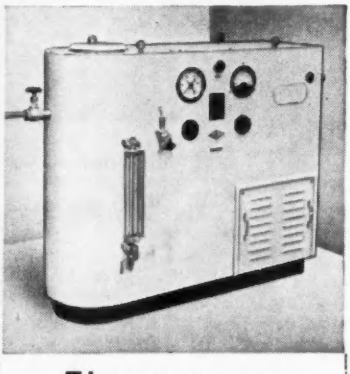
Venner Time Switches, Ltd. ... 38

Walter, D. & Co., Ltd. 72
Wandleside Cable Works, Ltd. 60
Westinghouse Brake & Signal Co., Ltd. 34
Wireohms, Ltd. 68
Wootton & Co., Ltd. 54

RAISING STEAM . . .



The hard way

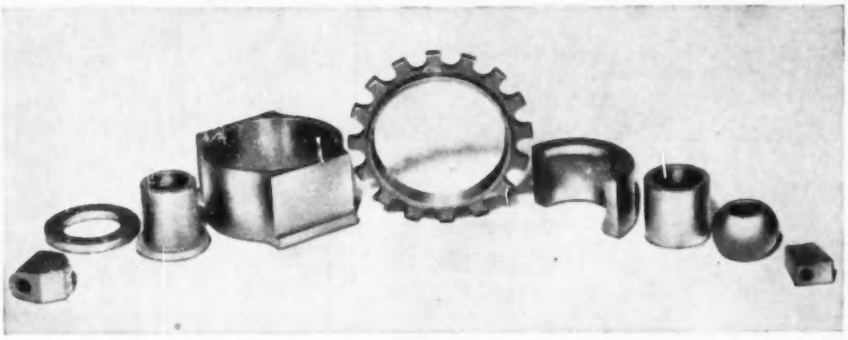


The easy way

. . . in the past entailed not only the disadvantages of fumes and smoke from furnaces but the construction of chimneys, boiler-houses and capacious fuel storage occupying much extra space, also fuel elevators and mechanical stoking devices. But all that is done away with where the new AUTOLEC ELECTRODE STEAM RAISER is installed. Comparatively small, compact, clean, it needs no special housing building, no fuel storage or chimney. Automatically controlled, it produces maximum steam output in a few minutes starting cold, and maintains it without attention with 98% efficiency—the highest ever achieved.

Switch to AUTOLEC *ELECTRODE* **STEAM RAISERS**

DESIGNED AND MANUFACTURED BY **G. W. B. ELECTRIC FURNACES LTD.** DIBDALE WORKS, DUDLEY, WORCS.
Proprietors: GIBBONS BROS. LTD. AND WILD-BARFIELD ELECTRIC FURNACES LTD.



SINTERED METAL PRODUCTS

OILITE

Self-lubricating bronze bearings.
Sintered (high-density) iron parts.

Sintered Superload bearings and structural parts.

Cored, solid and plate stock for machining.

Sintered metal filters.

Advantages gained from the above are :—

HIGH OIL CONTENT! ensures continuous lubrication.

HIGH STRENGTH! oil provides a hydraulic cushion that absorbs shock loads.

NO OIL DRIP! safe for TEXTILE & FOOD MACHINERY.

LOW COST! OILITE is die-pressed to exact specification —no expensive machining required.

THE MANGANESE BRONZE & BRASS CO. LTD.
ELTON PARK WORKS, HADLEIGH ROAD, IPSWICH.

Telegrams: "OILITE," IPSWICH. Telephone: 55415/55416

and now *Tudor for* BARKING 'C'

Repeat contracts are better than a lot of praise. For some years the Barking 'A' and 'B' Power Stations have had ample opportunity to test the efficiency of Tudor Batteries and the maintenance service provided by the Tudor Accumulator Company on the 6 batteries already installed there. Now comes a contract for the new Barking 'C' Station through A. Reyrolle & Co. Ltd., the suppliers of the Switchgear—convincing evidence that Tudor equipment matches its high reputation in this field. Write for publications No. 66A/1 and 69D.

Tudor

BATTERIES

SPECIFICATION & OPERATION OF BATTERY EQUIPMENT

Two 240-volt batteries each having a capacity of 400 ampere-hours will be installed, with duplicate Hewittic mercury arc quick charge rectifiers & Partridge, Wilson selenium metal trickle charge rectifiers.

The batteries will be used for operating Reyrolle switchgear, and will also supply emergency lighting and auxiliaries.

In normal circumstances one battery will float across the D.C. bus-bars and also across one mercury arc rectifier. The mercury arc rectifier will supply a continuous load having a maximum value of 15 amps, in addition to a trickle charge current through the battery. In the event of an emergency discharge being taken from the battery, it would be taken off the D.C. bars and quick charged by the mercury arc rectifier (capacity 19.8 kW.).

The second battery will be standing by on trickle charge. This will maintain the standby battery in a fully charged condition available for switching on to the D.C. bars should the first battery become discharged during a mains interruption.

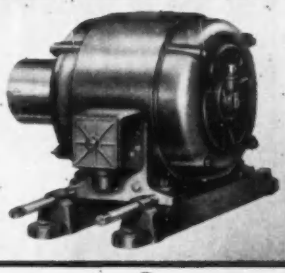
T.195

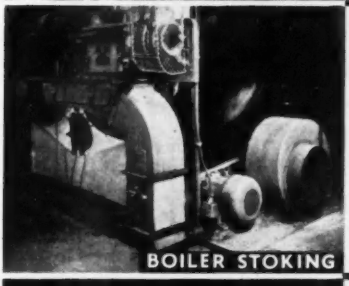
THE TUDOR ACCUMULATOR COMPANY LIMITED 50 GROSVENOR GARDENS LONDON SWI

BROOK *Industrial Motors*

PROTECTED CAGE

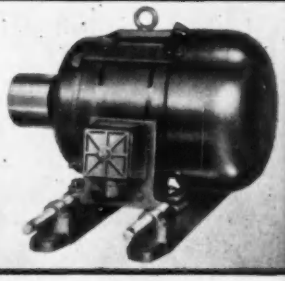
The general purpose motor for a thousand jobs where working conditions are normal.





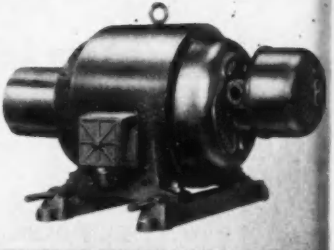
SURFACE COOLED

For the dustier situation it is better to use the Totally Enclosed Surface Cooled type.



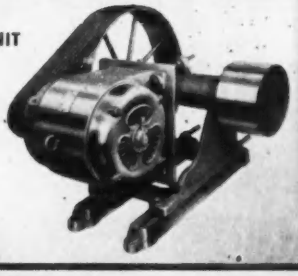
SLIP RING

If local starting conditions are severe a Slip Ring motor is a wise choice. Available in Protected and Surface Cooled enclosures.



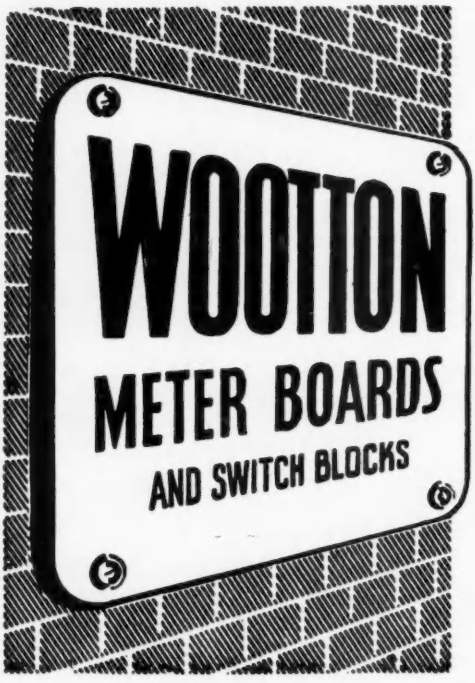
VEE BELT REDUCTION UNIT

Economical speed reduction from 4-1 can be attained by the installation of the patent Brook Vee Unit.



BROOK MOTORS Ltd

EMPRESS WORKS HUDDERSFIELD



We have been making and supplying the Electrical Industry with METER BOARDS and Switch Blocks for over 27 years

- FIRST CLASS WORK
- QUICK DELIVERIES
- COMPETITIVE PRICES

We invite your enquiries

WOOTTON & CO., LTD.
ALMA WORKS, PONDERS END, MIDDX.
TELEPHONE: HOWARD 1858
LI084B

VULCANISED
Fibre
Bakelite
Ebonite
AND
Presspahn

LEATHEROID, Insulating Tapes and Staples, Jointings.

FABRICATED PARTS

MOSSES & MITCHELL
LIMITED

60-68 IRONMONGER ROW, LONDON, E.C.1
PHONE: CLERKENWELL 4731 (P.B.E.)
Established 1865

SINGLE POLE AND NEUTRAL GEAR
by
SANDERS
WEDNESBURY

METAL CLAD SWITCH FUSE FOR CONDUIT ENTRY. 15 AMP. FUSE
LIST NO. N.101 RC.
CONSOLIDATED LIST PRICE: 10/6 EACH

The MECHANICAL CHARWOMAN

says

and now for a Prosperous New Year...

TO ALL COLUMBUS DEALERS

All set for a record-breaking year are sales for Columbus, the "Mechanical Charwoman"—the only machine in the world which does 5 different cleaning jobs in shops, offices, restaurants, hotels, hospitals and the home.

This is the time of the year when many business firms, local authorities, hospitals, and the like are preparing their purchasing budgets.

Go all out NOW to sell them the brilliant new idea of the "Mechanical Charwoman"—the valuable time and labour saving equipment which does all their cleaning jobs better and far more cheaply than they ever believed possible.

Promote .... Display .... and SELL ....

COLUMBUS

The Mechanical Charwoman

ONE MACHINE with interchangeable units for Scrubbing, Drying, Suction Polishing and Cleaning of all floors and floor coverings, and for Dusting from floor to ceiling.

PRICES from £32 10s. to £58 (plus Purchase Tax) according to requirements.

Individual appliances to do all these jobs would cost around £200. Few of your customers could afford that, but many will be in the market for the "Mechanical Charwoman."

COLUMBUS LTD., Wembley, Middlesex

The Leaders of the Industry. The only organisation specialising in power floor cleaning equipment for every purpose in Industry and the Home.

All these materials are manufactured by us to the highest standards. Please let us know your requirements, when we will gladly send you full details.

NON-FERROUS METALS
for the ELECTRICAL INDUSTRY

COPPER WIRE
Plain or tinned—for cable making, telephone wire, and strip for engineering purposes. Cotton, paper or asbestos covered—for winding electrical coils of all kinds.

COPPER STRAND
Plain or tinned—for overhead power transmission lines, earthing wire, etc.

COPPER STRIP
Plain or tinned, cotton, paper or asbestos covered—for transformer, electric motor and generator coils, etc.

COPPER or ALUMINIUM BUSBARS

ALUMINIUM CONDUIT TUBING
With plain ends or screwed with couplings.

ALUMINIUM ALLOY STRUCTURAL SHAPES
Extruded in various alloys according to purpose in a wide range of angles, channels, and other standard sections, or to special designs.

E. & E. KAYE LTD.
PONDERS END ENFIELD MIDDLESEX
Telephone : Howard 1601 *Telegrams : Cuwire, Enfield*
T.A.3185

Guaranteed Electrical Installations

Membership

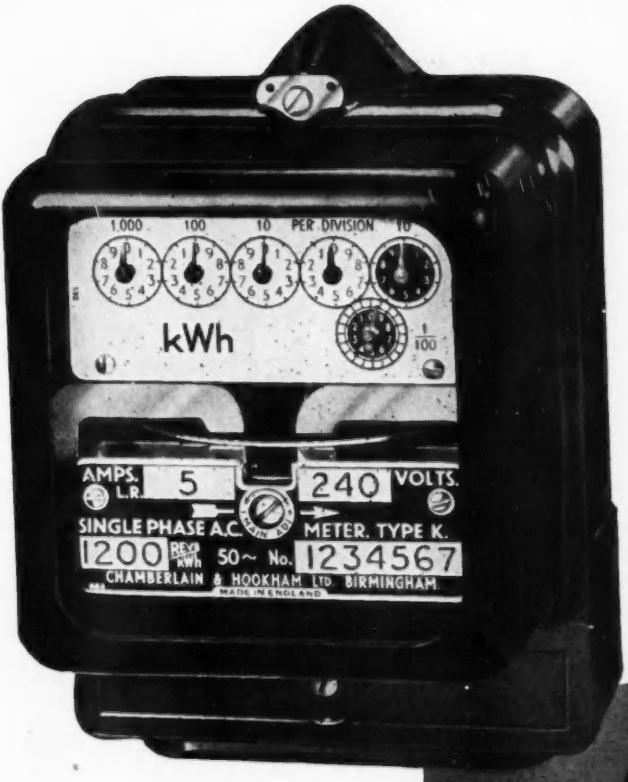
of the Electrical Contractors' Association is a privilege to those contractors who can offer skill and experience combined with a genuine desire to be of service to users of electricity.

They agree to comply with rigid standards of workmanship, and installations carried out by them are financially guaranteed by the Association.

For a safe and efficient installation place YOUR electrical work in the Safe Hands of an E.C.A. member.

For the names and addresses of E.C.A. members in your area, write to the

ELECTRICAL CONTRACTORS ASSOCIATION (INC.)
AFRICA HOUSE, KINGSWAY, W.C.2



The

C&H

TYPE "K" SINGLE PHASE METER

CONFORMING TO OVERALL DIMENSIONS, NEW FIXING CENTRES AND TERMINAL SPACINGS AS LAID DOWN IN B.S.S. 37/1937 AMENDMENT NO. 1. JUNE 1946.

CHAMBERLAIN & HOOKHAM LTD.
BIRMINGHAM

FLOODLIGHTS
'BUY' METWAY
for Festival of Britain

For details of the full range send 2½d. stamp or LIST No. ALG/30/"E.T." PROGRESS

METWAY ELECTRICAL INDUSTRIES LTD.

KING STREET, BRIGHTON, 1

Tel: Brighton 28366. Grams: 'Metway,' 'Phone, Brighton

PITMAN

Plastics Moulding Engineering

By M. Freund, Dipl.Ing., M.I.Mech.E. An illustrated study of the engineering principles and methods employed in plastics moulding. 45s. net.

Industrial Electrical Plant Maintenance

By E. G. Anness, M.I.E.E., Chartered Electrical Engineer. Deals fully with d.c. and a.c. motors and their associated control and protective gear, etc. 88 illustrations. 27s. 6d. net.

Transformers

By F. C. Connelly, Ph.D., A.M.I.E.E., A.R.C.S., D.I.C. 179 illustrations. 35s. net.

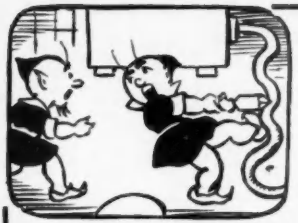
Electrical Technology

By H. Cotton, M.B.E., D.Sc., A.M.I.E.E. A standard textbook and reference work for electrical engineers and students. 449 illustrations. 18s. net.

Telephony Vol. II

By J. Atkinson, A.M.I.E.E. The second volume of this standard work deals fully with automatic exchange systems. Over 800 illustrations. 50s. net.

PITMAN, Parker Street, Kingsway, London, W.C.2



THE "FLUXITE QUINS" AT WORK

"What chance has a poor feller got
To finish this job on the dot
All set with FLUXITE,
But my iron's soldered tight.
Gone cold! And no bob for the slot."

For all SOLDERING WORK—you need FLUXITE—the paste flux—with which even dirty metals are soldered and "tinned." For the jointing of lead—without solder; and the "running" of white metal bearings —without "tinning" the bearing. It is suitable for ALL METALS—excepting ALUMINIUM—and can be used with safety on ELECTRICAL and other sensitive apparatus.

With Fluxite, joints can be "wiped" successfully that are *impossible by any other method.*

Used for over 40 years in Government works and by leading Engineers and Manufacturers. OF ALL IRONMONGERS in tins—10d., 1/6 and 3/-.

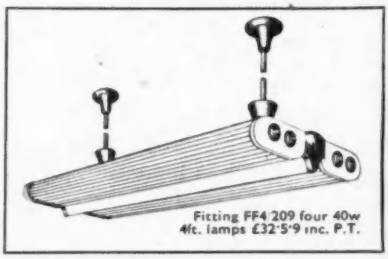
THE FLUXITE GUN puts FLUXITE where you want it by a simple pressure. Price 2/6 or filled 3/6.

FLUXITE

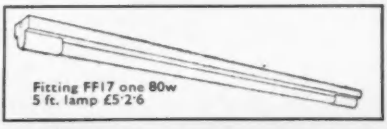
SIMPLIFIES *ALL* SOLDERING

Write for leaflets on case-hardening steel and tempering tools with FLUXITE, also on "Wiped" joints. Price 1d. each.
FLUXITE LTD. (Dept. E.T.), Bermondsey St., S.E

Do business with these new Fittings!



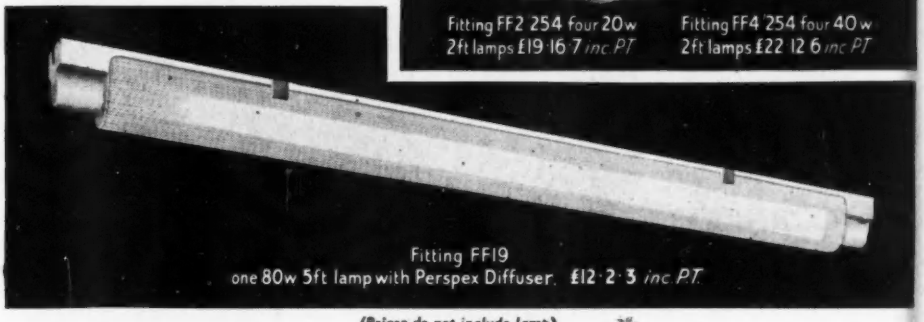
Fitting FF4 209 four 40w 4ft. lamps £32·5·9 inc. P.T.



Fitting FF17 one 80w 5 ft. lamp £5·2·6

Fitting FF2 254 four 20w 2ft lamps £19·16·7 *inc PT*

Fitting FF4 254 four 40w 2ft lamps £22·12·6 *inc PT*



Fitting FF19
one 80w 5ft lamp with Perspex Diffuser. £12·2·3 *inc PT*

(Prices do not include lamp)

EKCO'S LEADERSHIP IN FLUORESCENT LIGHTING is emphasised yet again by the magnificent FF254 series of decorative pendant fittings in two sizes and three ratings, which give you fresh opportunities to expand your lighting business. Diffusers and end pieces are of Perspex, and metal embossings and suspension rods are finished gold stoved enamel.

THE NAME IS

The single-lamp fitting Cat. No. FF17 is adaptable for ceiling mounting or suspension. By adding Cat. No. FF18 reeded Perspex diffuser it becomes model FF19, a decorative fitting for home, office or shop premises.

EKCO

FOR PLANNED LIGHTING

EKCO-ENSIGN ELECTRIC LTD., SOUTHEND-ON-SEA, ESSEX Tel: SOUTHEND 49491

LIGHTING ADVISORY SERVICE AND SALES OFFICES

LONDON . . . . . 5 Vigo St., London, W.1 Tel: Regent 7030
PRESTON . . . . . Kent St. Works, Preston, Lancs Tel: Preston 4628
CARDIFF . . . . . 50 Bridge St., Cardiff Tel: Cardiff 5426
GLASGOW . . . . . 26 India St., Glasgow C.2 Tel: Central 2012
NOTTINGHAM . . 57 Hounds Gate, Nottingham Tel: Nottingham 45862
BIRMINGHAM 40-42 Summer Row, Birmingham 3 Tel: Birmingham 2997

D

NOT JUST— CABLE

V.I.R. Taped and Braided; Tough Rubber; Lead Covered and Flexibles

BUT—

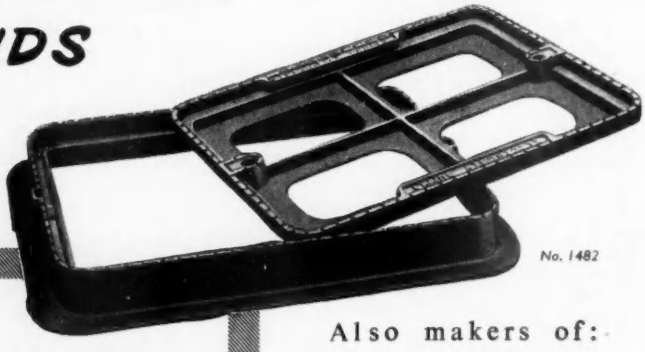
CABLE OF QUALITY

WANDLE BRITISH MADE CABLE

WANDLESIDE CABLE WORKS LTD.
106, Garratt Lane . Wandsworth . London, S.W.18

Telephone: Battersea 2572
Telegrams: Wandleside, London.

THOUSANDS have been SOLD...



No. 1482

ROUND CORNERED PAVEMENT COVERS AND FRAMES

16 Standard Sizes

Also makers of: Roadway Covers and Frames · Lamp Pillars and Brackets · Kiosks and Pillar Casings

ESTABLISHED 1814

HARDY & PADMORE LTD., WORCESTER. Tel: WORCESTER 3215

M-W.101

EAST LONDON MICA WORKS

(Est. 1912)

Manufacturers of:—

MICA	MICANITE	BAKELITE
Washers Plates Commutator Segments Stampings Stove Plates Heater Strips, etc.	Mouldings, Commutator Vee Rings, Tubes, Covered Bars, Commutator Segments, Heater Strips. Sheet Material in Moulding, Flexible, Heat Resisting and Commutator Qualities, etc.	Tubes Bushes Bobbins Washers Stampings Panels Covered Bars, etc.

RINGWOOD ROAD, WALTHAMSTOW, LONDON, E.17

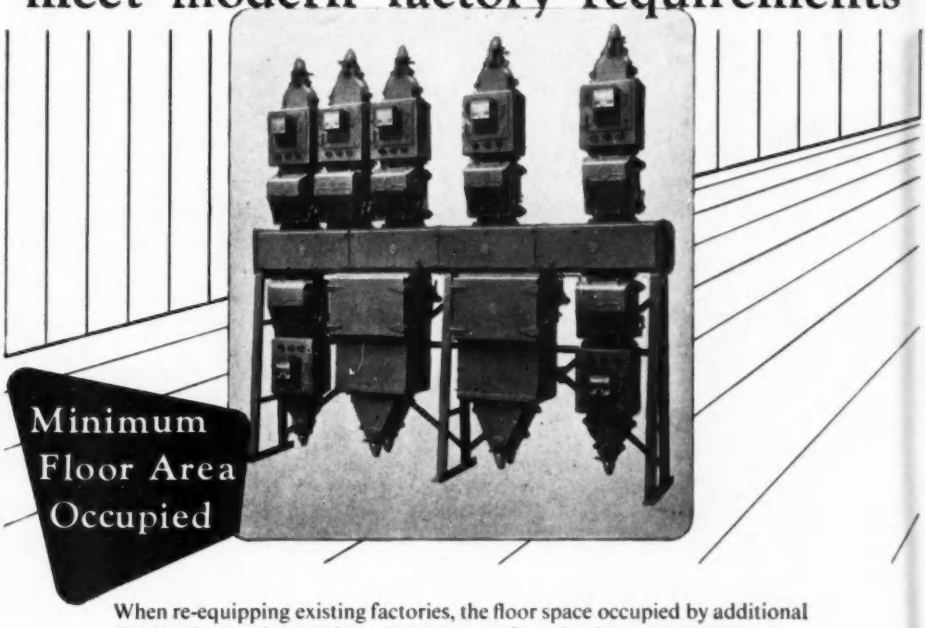
'Phone: KEYstone 4254 *Telegrams: Elmicmer, Easphone, London*

'ENGLISH ELECTRIC'

Combination

Fuse-Switch Boards

meet modern factory requirements



When re-equipping existing factories, the floor space occupied by additional distribution equipment is at the expense of production area.

'English Electric' Combination Fuse-Switch Boards are designed to permit direct-to-wall mounting with all parts accessible from the front, the maximum projection from the wall is only 1' 10".

The Board illustrated controls three 300-amp. and four 150-amp. feeder circuits, with two 500-amp. incoming switches, and provision for a fourth 300-amp. feeder circuit to be added later.

Send your enquiries to:

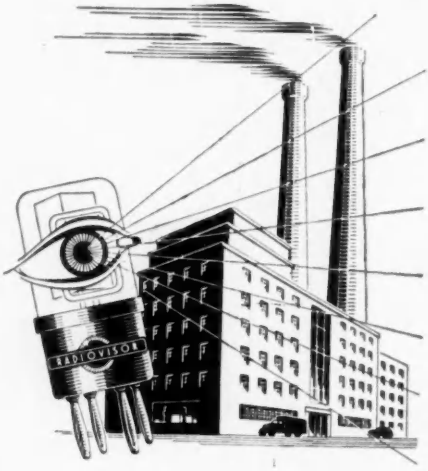
The ENGLISH ELECTRIC Company Ltd.

FUSEGEAR WORKS EAST LANCASHIRE ROAD, LIVERPOOL, 10

Works also at : STAFFORD : PRESTON : RUGBY : BRADFORD

RADIOVISOR

PHOTO ELECTRIC AND ELECTRONIC CONTROLS



Radiovisor Standard Equipment includes:

INDUSTRIAL SMOKE INDICATOR . 'FLAMESTAT' FLAME FAILURE CONTROL . AUTOMATIC RADIATION PYROMETER STREET AND FACTORY LIGHTING CONTROL . PRESS BRAKE GUARD RAY . COUNTING AND BATCHING UNIT . HOPPER AND BUNKER LEVEL CONTROL . INVISIBLE LIGHT RAY BURGLAR ALARM CONVEYOR CONTROL . SMOKE DETECTOR FIRE ALARM . ESCALATOR AND LIFT CONTROL . AUTOMATIC DOOR OPENING . TIME AND PROCESS CONTROL . PRINT REGISTRATION CONTROL . RACE TIMING . TURBIDITY INDICATOR . SMOKE ALARM

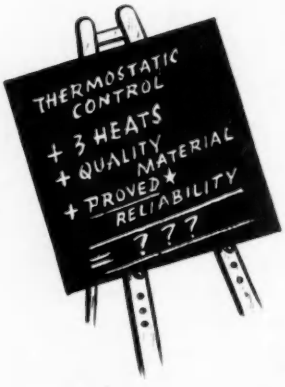
A Research and Development Department with a competent and experienced staff is at your service. It has helped many large concerns to overcome Control Problems peculiar to their own business.

Full particulars from . .

RADIOVISOR PARENT LTD.

1 STANHOPE STREET, LONDON, N.W.1

Telephone: EUSton 5905/6



There's only one answer

OF COURSE IT'S

A

PERMAHEAT

ELECTRIC BLANKET

From RETAILERS, STORES, BOOTS THE CHEMISTS etc. etc.

PERMAHEAT LTD. SPECTATOR STREET, MANCHESTER, 4

YOU CAN SEE IT A MILE OFF

. . . WHEN A J. & P. "D" FUSE-SWITCH IS BLOWN

You really can see a J. & P. "D" fuse-switch in the isolated position from a very long way off. On blowing, the tension on the catch holding the fuse-carrier is released, and the carrier swings down to give a clear indication of the source of the interruption.

Other advantages of this cheap and simple fuse that has been sold in tens of thousands all over the world, are: rewiring at ground level; use as an ordinary isolator; and single bolt fixing on most sizes. It is available for voltages up to 33 kV, and a repeater type can be provided.

Full details are given in Publication SG.51.

JOHNSON & PHILLIPS LTD.
CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

G2

Make a better job of it!

with the

HENLEY SOLON

TRADE MARK

ELECTRIC **SOLDERING IRONS**

5 models

CONSTANT HEAT

ALL THE HEAT IS IN THE BIT

PERFECT BALANCE FOR EASY HANDLING

ALL CONNECTIONS HOUSED AT END OF HANDLE AWAY FROM THE HEAT

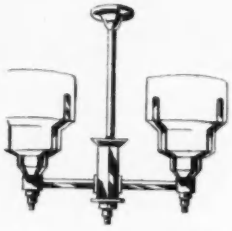
CORD GRIP SECURES FLEXIBLE (prevents twist or pull being transmitted to internal wiring)

Write for Folder Y.10.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.,
51-53 Hatton Garden, London, E.C.1

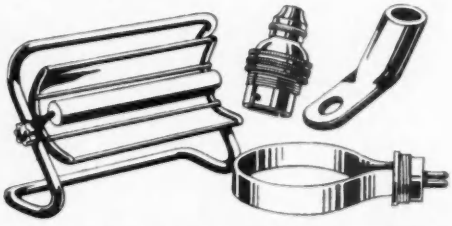
Serck

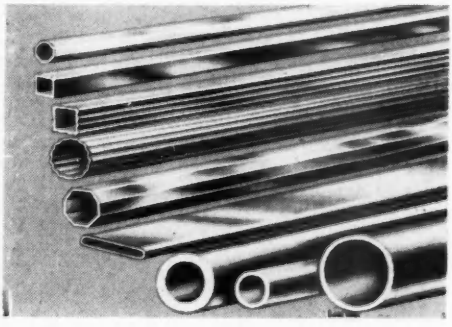
TUBES get into hot water!



Serck Tubes are prominent throughout the electrical instrument component and accessory trade. Their versatility is in ever increasing demand.

SERCK TUBES LTD., WARWICK ROAD, BIRMINGHAM, 11





Patents applied for

100 WATT **2/-** *plus 7d.* P.T.

60 WATT } **1/7** *plus 5d.* P.T.
40 WATT }

The Coiled Coil filament in the Mazda Silverlight lamp means an increase of up to 20% in the amount of light for the same current consumption.

MAZDA SILVERLIGHT coiled coil Tungsten Lamps are designed specially for installations where the lamp is wholly or partially visible. Glare is eliminated. A soft white light is spread evenly over the entire lamp. This almost perfect diffusion means a softer, kinder, more luxurious light, and makes reading and all "seeing" tasks easier and infinitely more enjoyable.

MAZDA

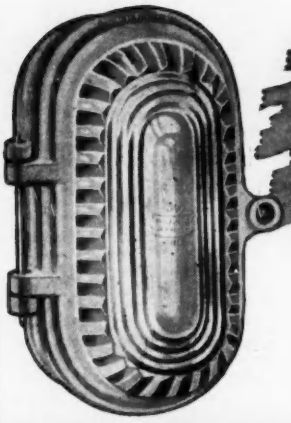
THE OUTSHINING LIGHT

MAZDA LAMPS AND LIGHTING EQUIPMENT

Made in England by B T-H *Leaders in Lighting*

The British Thomson-Houston Co Ltd, London, W.C.2. *Member of the A.E.I. Group of Companies*

4311



Maximum Lighting...

AT MINIMUM COST

★ New silicon alloy die cast case to BSS. 1490.

★ Internal fixing at brick width.

★ Scientifically designed prisms ensure light at all angles.

★ Two sizes — 60W and 100W.

★ Can be mounted on BS conduit box at almost any angle.

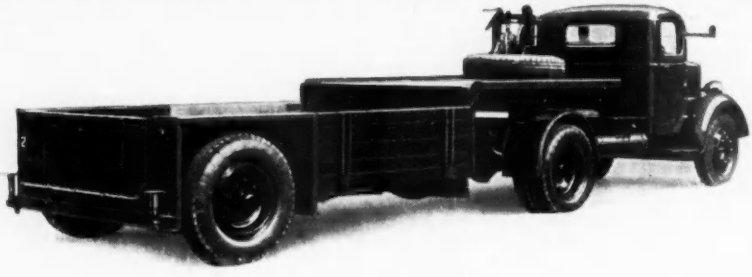
Write for List L.134

ET 1Y50

DORMAN DIOLUX

60W. AND 100W.

DORMAN & SMITH LTD
MANCHESTER · 5



The above illustrates a 6-ton Drop Frame Semi-trailer for the Transport of Cable Drums and Transformers, etc., and is one of a large fleet recently delivered. The lower deck has a space of 10ft. 0in. by 5ft. 3in., and is steel lined with ¼in. plates and fitted with detachable 1ft. 6in. sides. The top deck is fitted with a hand operated winch and necessary cable, and as well as the taildoor at the rear of the body, special loading skids are also provided.

EAGLE ENGINEERING CO., LTD.

WARWICK, ENGLAND. Tel.: Warwick 126, 127, 128. 'Grams: 'Eagle, Warwick.'

5019 A

BY APPOINTMENT
MANUFACTURERS OF
ELECTRIC LAMPS
TO H.M. THE KING

When your customers

go to the pictures

read the newspapers

look into shop windows

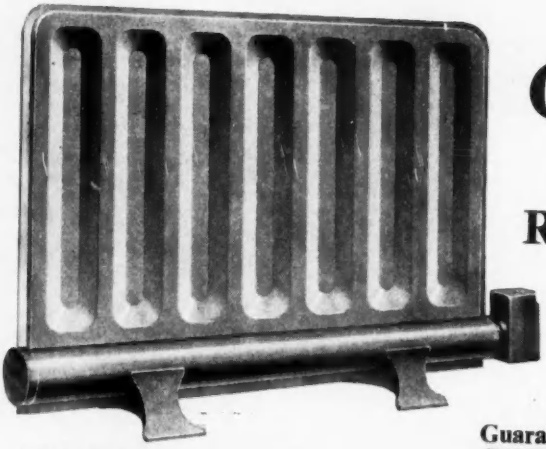
Wherever people go they're going to be reminded of Crompton Lamps. There's a Cartoon advertising film in Technicolor to be shown at 557 of the main cinemas — advertisements in national and local newspapers and magazines — and attractive window display material and literature to put you right in the picture. This season it will pay you more than ever to . . . .

. . . . SWITCH TO

Crompton

CROMPTON PARKINSON LTD. · CROMPTON HOUSE · ALDWYCH · LONDON · W.C.2

Central Heating Automatically Controlled with GRUBB All Electric RADIATORS



•

Write for Trade Terms and Brochures

•

Guaranteed for Twelve Months

Sole Manufacturers:

GRUBB ENGINEERING COMPANY LIMITED

BIRMINGHAM, 12. **EXPORT ENQUIRIES INVITED**

PERFORATED METAL . . .

for Covers and Panels on Electrical Machinery, Equipment and Motors

2515 B

For new and used machine tools . . . power presses . . . sheet metal working and woodworking machinery, etc. . . . **F. J. EDWARDS, LIMITED**, *359-61, Euston Road, London, N.W.1. Tel: Euston 4681-3771. 'Grams: Bescotools Norwest London*

WINTER FOR WARMTH — INDUSTRIAL — SUMMER FOR COOLING

WARM O' COOL

FAN UNIT HEATER

SOUTHERN CENTRAL HEATING Co — 4a STANLEY Rd SOUTHEND-ON-SEA

WIREOHMS LTD

OF NOTTINGHAM

Finest Quality

ELECTRIC HEATING ELEMENTS

for all purposes

Orders and enquiries to our World Distributors:

Messrs. H. J. BALDWIN & Co. Ltd

Baldwin House

Phone 85266 **NOTTINGHAM**

60 kVAr Power Factor Correction Capacitor (comprising 2 units, stanchion mounted).

50 kVAr Capacitor with Contactor (part of an automatically-controlled Power Factor Correction installation).

Standard Capacitors for POWER FACTOR CORRECTION

The new range of ***Standard*** Power Factor Correction Capacitors represents a significant advance in design. Increased cooling surface/kVA ratio results in great reliability in service. Flexibility of layout reduces floor-area required for installation and facilitates mounting on walls or stanchions.

Well adapted to automatic control, ***Standard*** Power Factor Correction Capacitors are simple in operation and low in first cost.

To those considering the power factor correction of electrical plant the advice of ***Standard*** engineers is available. Without charge, without obligation and without delay a visit can be arranged, load conditions investigated, and an estimate prepared.

Please apply to :

Standard Telephones and Cables Limited

(Registered Office : Connaught House, Aldwych, London, W.C.2)

POWER LINE DIVISION (DEPARTMENT 2440)
NORTH WOOLWICH, LONDON, E.16. TELEPHONE : ALBERT DOCK 1401 (EXT. 796)

THE NAME IS *Best* FOR QUALITY

This "BEST" COFFEE PERCOLATOR has a 2½-pint capacity, almost instant percolation, a special "keep hot" device and an automatic safety cut-out for the heater. Elegant in design and of superb craftsmanship in heavy gauge copper, it is finished in polished chrome. Loading 500 watts —A.C. only, 100/120, 200/220 and 230/250 volts.

"BEST" ELECTRIC KETTLE

Nominal capacity 3½ pints, the "BEST" Electric Kettle is beautifully made in solid copper with polished nickel or chromium finish (tinned internally). 1250-watt heater with Automatic Safety Connector-Ejector. For 100/120, 200/220, 230/250 volts, A.C./D.C.

"BEST" ELECTRIC JUGS

are useful alternatives to kettles for hot or boiling water supply. Their chromium plated repoussé finish on solid copper graces any table, and special insulated feet protect even the most highly polished surfaces. Capacity: 2 pints (700 watts), or 4 pints (1250 watts); voltages as above.

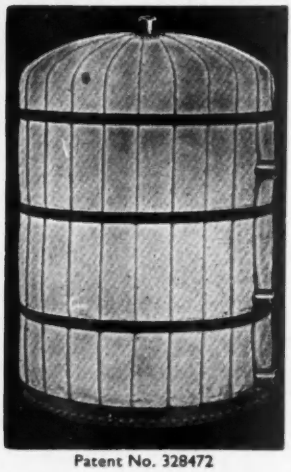
SPARE "BEST" ELEMENTS

of Non-Automatic and Automatic Safety Connector-Ejector types are of thoroughly reliable construction. Two sizes: 700 watts for 2-pint kettles, and 1250 watts for 3½, 4 or 6-pint kettles. Automatic thermal switch (bimetal) elements are available, also higher loadings if required.

Best Products Ltd.

FELIX WORKS, FELIXSTOWE, SUFFOLK
Phone: Felixstowe 554. Grams: Best, Felixstowe
B12

SAVE FUEL COSTS



Patent No. 328472

with the
"EETO"
CYLINDER JACKET.

Made in sections. Connecting pipes offer no difficulty. **EETO** jackets considerably increase hot water supply with less fuel.
Used in large numbers by Heating Engineers for Housing Schemes, and extensively in conjunction with Immersion Heaters, etc.
EETO jackets are also made for Horizontal cylinders, square and rectangular tanks.

- **Enormous reduction in heat losses**
- **Finest Insulating Materials only**

Sole Makers:
EETO INSULATIONS
River Street, BOLTON

ELECTRIC MOTORS

Fractional—50 H.P.
Repaired and Rewound

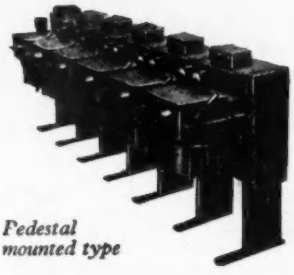
WALTER CRANE
GREENCOAT WORKS, WAKEFIELD

VARNISHED SLEEVINGS IN COTTON, SILK AND GLASS

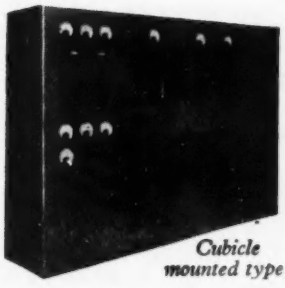
INSULATING MATERIALS

LAMINATED BAKELITE TUBES AND FORMERS

W. H. GRIMMER
50, BOW LANE, CHEAPSIDE, LONDON, E.C.4.
CITY 1791/2 CABLES—CHARTIMER LONDON



Pedestal mounted type



Cubicle mounted type

Increasing load on the electricity supply distribution system calls for the installation of industrial type switchgear of the utmost reliability.

The fully tested type 'K' range of switchgear, manufactured by 'Ferguson Pailin Ltd,' has been designed for use on systems up to 660 volts and for normal current ratings up to 1,600 amps. The unit is strongly constructed and has the great advantage of small dimensions for its capacity, so that it may be mounted in the place most convenient to the area where power is required. It may be pedestal or cubicle mounted and can be arranged for single unit or switchboard.

Full information on this type of Switchgear will be gladly sent on request to interested Executives or responsible officials.

FERGUSON PAILIN LTD.

MEMBER OF THE A.E.I. GROUP OF COMPANIES

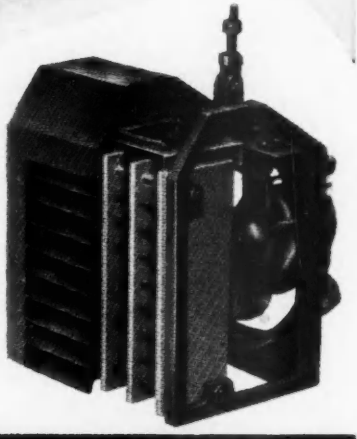
Switchgear Specialists

MANCHESTER, 11. ENGLAND

UNIT HEATERS

Made in 3 sizes 3, 5 and 10 Kw

- ALL ELECTRIC
- SIMPLE TO INSTAL
- ECONOMICAL TO RUN
- AUTOMATIC CONTROL
- REFRESHING ATMOSPHERE IN SUMMER
- AUGMENTS EXISTING HEATING SYSTEMS
- MINIMUM OF MAINTENANCE



SEND FOR LIST 57

CARTER & COMPANY (NELSON) LTD.

NELSON LANCASHIRE TELEPHONE · 638

LIGHTING EQUIPMENT for the **CINEMA, STAGE AND BALLROOM**

SEND FOR TRADE CATALOGUE

ALSO **WEATHERPROOF FLOODLIGHTS**

D. WALTER & CO. LTD., ACTUAL MAKERS

61-63 LANT STREET, S.E.1. *HOP 3651*

"EVOLITE".

PERSPEX TUBES AND CYLINDERS

Fabricating, Welding and Machining

Consult—

RICHARD DALEMAN LTD., 325/327 Latimer Rd. LONDON, W.10. Phone: LADbroke 1879/3709

INSTRUCTION CHART

For dealing with apparent death from

ELECTRIC SHOCK

(*In accordance with H.O. Electy. Reg.* 29)

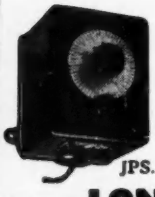
Mounted on strong board, varnished and corded for hanging

PRICE 3/- plus 10d. postage (per single copy)

ELECTRICAL TIMES

Sardinia House, Sardinia St., LONDON, W.C.2.

PROCESS TIMERS



5¾" x 6" x 5¼"

For flush or wall mounting.

Type JPS. Hand Resetting Timer.

Type SRJ. Automatically Resetting Timer.

BOTH SYNCHRONOUS

JPS. *Ask for Lists* 120 & 121 ET

LONDEX LTD

Manufacturers of Relays

207, ANERLEY RD., LONDON, S.E.20. SYDenham 6258-9

Rewinding a 35 h.p. 500v. D.C. motor with "Fibreglass"—base insulation for class B duty in a glass works. Photo by courtesy Pilkington Brothers Ltd.

FIBREGLASS

TRADE MARK

— for ELECTRICAL INSULATION

Yarns, Tapes, Sleevings & Tying Cords

Experience has shown that a low alkali content is essential in glass textiles used for electrical insulation. " Fibreglass " yarn is substantially free from alkali and is **Electrical Insulation at its best.**

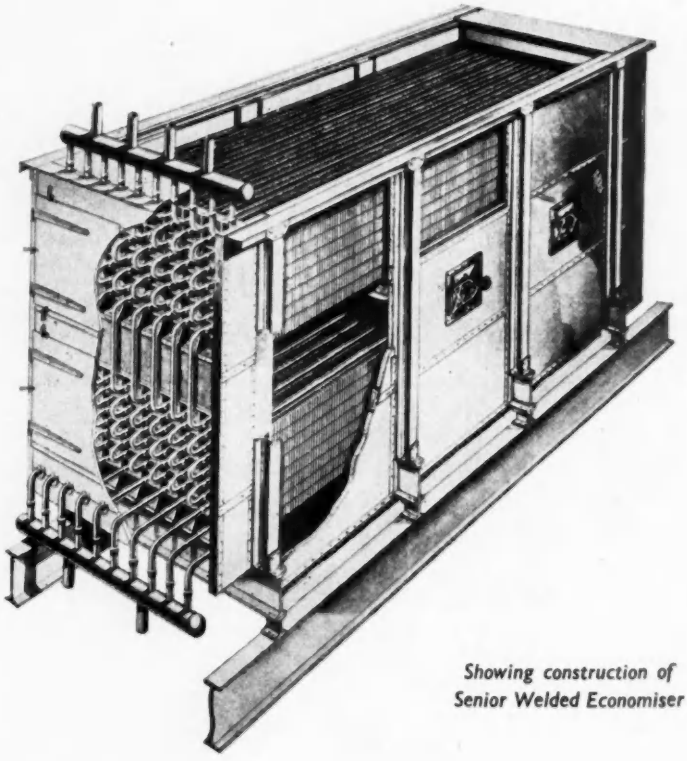
The price of inferior insulation is a heavy one. If insulation is destroyed, electrical equipment fails—valuable working hours are lost—important deliveries are delayed. Nothing but the best insulation available is good enough for your equipment. Since " Fibreglass " is made of glass, it is inorganic, acid resistant, and unaffected by corrosive fumes or heat—and since the glass is very low in alkali it is also unaffected by moisture.

Fibreglass Limited, Ravenhead, St. Helens, Lancs. (St. Helens 4224)

LONDON OFFICE:	GLASGOW OFFICE:	NEWCASTLE-ON-TYNE OFFICE:
63/65 Piccadilly, W.1.	136 Renfield Street.	c/o Pilkington Brothers Ltd,
(Regent 2115/6)	(Douglas 2687)	Westgate Road. (Newcastle 20938)

SENIOR ECONOMISER

WELDED TYPE, FOR CENTRAL POWER STATIONS



Showing construction of Senior Welded Economiser

For all operating pressures up to the highest

SENIOR ECONOMISERS LTD., 11 SOUTHAMPTON ROW, LONDON W.C.1

Telephone : HOLborn 7543-4 and 1158

Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts., and published at Sardinia House, Sardinia Street, London, W.C.2. January 4, 1951.

AEROFLEX CERAM TYPE CSK

60 AMP REWIRABLE CARTRIDGE FUSE LINKS

Wirings 60, 45, 30 and 15 amps.

These fuse cartridges comply with the dimensions of BS 1361 for 60 amp. main fuses in consumers' units but retain all the properties of earlier Aeroflex fuses. They have been tested and certified by A.S.T.A. in Aeroflex type AFSK units in Category AC4 of BS 88 at 440 volts. Aeroflex Ceram type CSK fuses withstand frequent momentary heavy overloads and yet will operate on persistent light overloads with a fusing factor of 1.25. There is no deterioration through ageing and no change in cold resistance.

Aeroflex Ceram CSK Fuses are entirely suitable both for domestic circuits and 440v. 3-phase services.
Our publication HS 2 gives full details.

BS 1361 DIMENSIONS and Discrimination Test
BS 88 Category 440 AC4 Class P Performance

LONDON:
34 *Victoria Street, S.W.1*
GLASGOW:
162 *Buchanan Street, C.1*

Aeroflex
HOPE'S PATENTS

PARMITER HOPE & SUGDEN LTD.
FLUVENT ELECTRICAL WORKS, LONGSIGHT, MANCHESTER, 12.

dm PH 31

SMITH METERS

measure accurately at all loads

Accuracy is inherent in all Smith Meters; it is built in by correct design and sturdy construction. No other meter incorporates all these features :—

Type P. Polyphase Meter

Compensated for temperature fluctuation

Single laminated construction

Sound scientific design of driving element

Voltage flux by-pass

Perfect graph curve at all loads

Specify

SMITH METERS

SMITH METERS LTD · ROWAN RD · STREATHAM VALE · LONDON · SW 16